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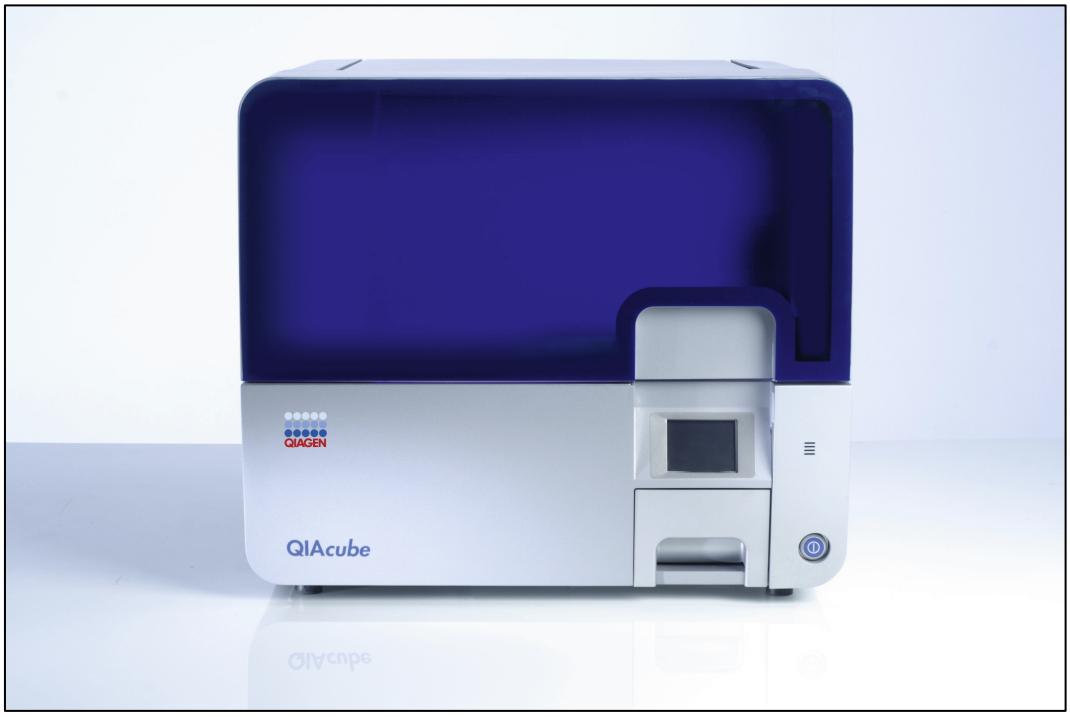
QIAcube® User Manual



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Sample & Assay Technologies

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1 Safety Information

Before using the QIAcube, it is essential that you read this user manual carefully and pay particular attention to the safety information. The instructions and safety information in the user manual must be followed to ensure safe operation of the instrument and to maintain the instrument in a safe condition.

The following types of safety information appear throughout this manual.

WARNING	The term WARNING is used to inform you about situations that could result in **personal injury** to you or other persons. Details about these circumstances are given in a box like this one.

CAUTION	The term CAUTION is used to inform you about situations that could result in **damage to the instrument** or other equipment. Details about these circumstances are given in a box like this one.

The advice given in this manual is intended to supplement, not supersede, the normal safety requirements prevailing in the user's country.

1.1 Proper use

WARNING	**Risk of personal injury and material damage** [W1] Improper use of the QIAcube may cause personal injuries or damage to the instrument. The QIAcube must only be operated by qualified personnel who have been appropriately trained. Servicing of the QIAcube must only be performed by QIAGEN Field Service Specialists.

Perform the maintenance as described in Section 6. QIAGEN charges for repairs that are required due to incorrect maintenance.

WARNING	**Risk of personal injury and material damage** [W2] The QIAcube is too heavy to be lifted by one person. To avoid personal injury or damage to the instrument, do not lift the instrument alone.

WARNING	**Risk of personal injury and material damage** [W3] Do not attempt to move the QIAcube during operation.

CAUTION	**Damage to the instrument** [C1] Avoid spilling water or chemicals onto the QIAcube. Damage caused by water or chemical spillage will void your warranty.

In case of emergency, switch off the QIAcube at the power switch at the front of the instrument and unplug the power cord from the power outlet.

CAUTION	**Damage to the instrument** [C2] Only use QIAGEN® spin columns and QIAGEN Spin Kits with the QIAcube. Damage caused by use of other types of spin column or chemistries will void your warranty.

1.2 Electrical safety

Disconnect the line power cord from the power outlet before servicing.

WARNING	**Electrical hazard** [W4] Any interruption of the protective conductor (earth/ground lead) inside or outside the instrument or disconnection of the protective conductor terminal is likely to make the instrument dangerous. Intentional interruption is prohibited. **Lethal voltages inside the instrument** When the instrument is connected to line power, terminals may be live, and opening covers or removing parts is likely to expose live parts.

To ensure satisfactory and safe operation of the QIAcube, follow the advice below:

- The line power cord must be connected to a line power outlet that has a protective conductor (earth/ground).
- Do not adjust or replace internal parts of the instrument.
- Do not operate the instrument with any covers or parts removed.
- If liquid has spilled inside the instrument, switch off the instrument, disconnect it from the power outlet, and contact QIAGEN Technical Services.

If the instrument becomes electrically unsafe, prevent other personnel from operating it, and contact QIAGEN Technical Services; the instrument may be electrically unsafe when:

- It or the line power cord appears to be damaged.
- It has been stored under unfavorable conditions for a prolonged period.
- It has been subjected to severe transport stresses.

1.3 Environment

Operating conditions

WARNING	**Explosive atmosphere** [W5] The QIAcube is not designed for use in an explosive atmosphere.

WARNING	**Risk of explosion** [W6] The QIAcube is intended for use with reagents and substances supplied with QIAGEN kits. Use of other reagents and substances may lead to fire or explosion.

CAUTION	**Damage to the instrument** [C3] Direct sunlight may bleach parts of the instrument and cause damage to plastic parts. The QIAcube must be located out of direct sunlight.

1.4 Biological safety

Specimens and reagents containing materials from humans should be treated as potentially infectious. Use safe laboratory procedures as outlined in publications such as *Biosafety in Microbiological and Biomedical Laboratories*, HHS (www.cdc.gov/od/ohs/biosfty/biosfty.htm).

Samples

Samples may contain infectious agents. You should be aware of the health hazard presented by such agents and should use, store, and dispose of such samples according to the required safety regulations.

WARNING	**Samples containing infectious agents** [W7]
	Some samples used with this instrument may contain infectious agents. Handle such samples with the greatest of care and in accordance with the required safety regulations. Always wear safety glasses, 2 pairs of gloves, and a lab coat. The responsible body (e.g., laboratory manager) must take the necessary precautions to ensure that the surrounding workplace is safe, and that the instrument operators are suitably trained and not exposed to hazardous levels of infectious agents as defined in the applicable Material Safety Data Sheets (MSDSs) or OSHA,* ACGIH,† or COSHH‡ documents. Venting for fumes and disposal of wastes must be in accordance with all national, state, and local health and safety regulations and laws.

* OSHA: Occupational Safety and Health Administration (United States of America).

† ACGIH: American Conference of Government Industrial Hygienists (United States of America).

‡ COSHH: Control of Substances Hazardous to Health (United Kingdom).

1.5 Chemicals

WARNING	**Hazardous chemicals** [W8]
	Some chemicals used with this instrument may be hazardous or may become hazardous after completion of the protocol run. Always wear safety glasses, gloves, and a lab coat. The responsible body (e.g., laboratory manager) must take the necessary precautions to ensure that the surrounding workplace is safe and that the instrument operators are not exposed to hazardous levels of toxic substances (chemical or biological) as defined in the applicable Material Safety Data Sheets (MSDSs) or OSHA,* ACGIH,† or COSHH‡ documents. Venting for fumes and disposal of wastes must be in accordance with all national, state, and local health and safety regulations and laws.

* OSHA: Occupational Safety and Health Administration (United States of America).

† ACGIH: American Conference of Government Industrial Hygienists (United States of America).

‡ COSHH: Control of Substances Hazardous to Health (United Kingdom).

WARNING	**Risk of fire** [W9]
	When cleaning the QIAcube with alcohol-based disinfectant, leave the QIAcube door open to allow flammable vapors to disperse. Only clean the QIAcube when worktable components have cooled down.

Toxic fumes

If working with volatile solvents or toxic substances, you must provide an efficient laboratory ventilation system to remove vapors that may be produced.

WARNING	**Toxic fumes** [W10]
	Do not use bleach to disinfect used labware. Bleach in contact with salts from the buffers used can produce toxic fumes.

1.6 Waste disposal

Used labware, such as sample tubes, QIAGEN spin columns, filter-tips, or rotor adapters, may contain hazardous chemicals or infectious agents from the purification process. Such wastes must be collected and disposed of properly according to local safety regulations.

For information about how to dispose of the QIAcube, see Appendix A.

1.7 Mechanical hazards

The door of the QIAcube must remain closed during operation of the instrument. Only open the door when instructed to do so by the software.

WARNING	**Moving parts** [W11] To avoid contact with moving parts during operation of the QIAcube, the instrument must be operated with the door closed. If the door sensor is not functioning correctly, contact QIAGEN Technical Services.

Centrifuge

Make sure that the rotor and buckets are installed correctly. All buckets must be mounted before starting a protocol run, even if processing fewer than 12 samples. If the rotor or buckets show signs of mechanical damage or corrosion, do not use the QIAcube; contact QIAGEN Technical Services.

CAUTION	**Damage to the instrument** [C4] The QIAcube must not be used if the centrifuge lid is broken or if the lid lock is damaged. Make sure that the rotor is installed correctly and that all buckets are properly mounted, even if processing fewer than 12 samples. Load the rotor symmetrically. Only use rotors, buckets, and consumables designed for use with the QIAcube. Damage caused by use of other consumables will void your warranty.

In case of breakdown, caused by power failure, the centrifuge lid can be manually opened to remove the samples (see Section 7.2.7, page 7-15).

WARNING	**Moving parts** [W12] In case of breakdown caused by power failure, remove the power cord and wait 10 minutes before attempting to manually open the centrifuge lid.

WARNING	**Risk of personal injury and material damage** [W13] Raise the centrifuge lid carefully. The lid is heavy and may cause injury if it falls down.

WARNING	**Risk of overheating** [W14] To ensure proper ventilation, maintain a minimum clearance of 10 cm at the sides and rear of the QIAcube. Slits and openings that ensure the ventilation of the QIAcube must not be covered.

1.8 Heat hazard

The QIAcube worktable contains a heated shaker.

WARNING	**Hot surface** [W15] The shaker can reach temperatures of up to 70°C (158°F). Avoid touching it when it is hot.

1.9 Translations of warnings and cautions

This subsection contains translations of the warnings and cautions used in this user manual. Each warning or caution has a reference number in square brackets at the top right of its box.

WARNING	The term WARNING is used to inform you about situations that could result in **personal injury** to you or other persons. Details about these circumstances are given in a box like this one.

DE	**WARNING (WARNUNG)** WARNUNG weist auf Situationen und Umstände hin, die zu einer **Verletzung** des Benutzers oder anderer Personen führen können. Nähere Angaben zu der Art der Gefährdung und der Vermeidung solcher Situationen werden in einem Textfeld wie diesem neben der Warnung gemacht.
FR	**WARNING (DANGER)** La formule WARNING (DANGER) est utilisée pour avertir des situations pouvant occasionner des **dommages corporels** à l'utilisateur ou à d'autres personnes. Les détails sur ces circonstances sont données dans un encadré semblable à celui-ci.

WARNING 	**Risk of personal injury and material damage** [W1] Improper use of the QIAcube may cause personal injuries or damage to the instrument. The QIAcube must only be operated by qualified personnel who have been appropriately trained. Servicing of the QIAcube must only be performed by QIAGEN Field Service Specialists.
DE	**Verletzungsgefahr und Beschädigung des Gerätes** Die unsachgemäße Bedienung des QIAcube kann zu einer Verletzung des Benutzers oder zur Beschädigung des Gerätes führen. Die Bedienung des QIAcube darf nur durch qualifiziertes Personal, das entsprechend geschult wurde, erfolgen. Die Wartung des QIAcube darf nur durch Mitarbeiter des QIAGEN Kundendienstes durchgeführt werden.
FR	**Risque de dommages corporels et matériels** L'utilisation non convenable du QIAcube peut causer des blessures ou des détériorations de l'instrument. Le QIAcube ne doit être utilisé que par du personnel qualifié qui a été formé de façon appropriée. Seul un ingénieur du service après-vente QIAGEN est autorisé à effectuer des travaux d'entretien sur le QIAcube.

WARNING	**Risk of personal injury and material damage** [W2] The QIAcube is too heavy to be lifted by one person. To avoid personal injury or damage to the instrument, do not lift the instrument alone.
DE	**Verletzungsgefahr und Beschädigung des Gerätes** Der QIAcube ist zu schwer um von einer Person gehoben zu werden. Um Verletzungen des Benutzers oder eine Beschädigung des Gerätes zu vermeiden ist davon abzusehen, das Gerät alleine zu heben.
FR	**Risque de dommages corporels et matériels** Le QIAcube est trop lourd pour être soulevé par une personne. Pour éviter des dommages corporels ou matériels, ne pas soulever l'instrument tout seul.

WARNING	**Risk of personal injury and material damage** [W3] Do not attempt to move the QIAcube during operation.
DE	**Verletzungsgefahr und Beschädigung des Gerätes** Den QIAcube während eines Laufes nicht bewegen.
FR	**Risque de dommages corporels et matériels** Ne pas essayer de bouger le QIAcube pendant son fonctionnement.

WARNING	**Electrical hazard** [W4] Any interruption of the protective conductor (earth/ground lead) inside or outside the instrument or disconnection of the protective conductor terminal is likely to make the instrument dangerous. Intentional interruption is prohibited. **Lethal voltages inside the instrument** When the instrument is connected to line power, terminals may be live, and opening covers or removing parts is likely to expose live parts.

DE	**Gefährdung durch Elektrizität** Das Gerät muss zum Betrieb immer geerdet sein. Es ist verboten, die Schutzleiter im Gerät oder in der Netzzuleitung zu trennen oder zu entfernen. **Gefährliche Spannung im Gerät** Auch in ausgeschaltetem Zustand kann an einigen Stellen im Gerät Netzspannung anliegen, wenn das Gerät am Stromnetz angeschlossen ist. Das Öffnen oder Entfernen von Gehäuseteilen kann diese stromführenden Teile freilegen.
FR	**Risque d'électrocution** Toute interruption du conducteur de protection à l'intérieur ou à l'extérieur de l'instrument, ou déconnexion du raccord du conducteur de protection (terre) peut rendre l'instrument dangereux. Il est interdit d'interrompre volontairement ce conducteur. Présence de tensions mortelles dans l'instrument Lorsque l'instrument est relié au secteur, les raccords peuvent être sous tension, et des parties sous tension peuvent être découvertes en ouvrant des capots ou en retirant des pièces (à l'exception de celles auxquelles il est possible d'accéder manuellement).

WARNING 	**Explosive atmosphere** [W5] The QIAcube is not designed for use in an explosive atmosphere.
DE	**Explosionsfähige Atmosphären** Der QIAcube darf nicht in explosionsfähigen Atmosphären betrieben werden.
FR	**Atmosphère explosive** Le QIAcube n'est pas conçu pour fonctionner dans une atmosphère explosive.

WARNING 	**Risk of explosion** [W6] The QIAcube is intended for use with reagents and substances supplied with QIAGEN kits. Use of other reagents and substances may lead to fire or explosion.

DE	**Explosionsgefahr** Der QIAcube ist ausschließlich mit Reagenzien und Substanzen aus den QIAGEN Kits zu benutzen. Die Benutzung von anderen Reagenzien oder Substanzen kann Feuer oder eine Explosion auslösen.
FR	**Risque d'explosion** Le QIAcube a été conçu pour l'utilisation des réactifs et substances fournis par les kits QIAGEN. L'utilisation de réactifs et de substances autres que celles indiquées peut entrainer un risque d'incendie ou d'explosion.

WARNING 	**Samples containing infectious agents** [W7] Some samples used with this instrument may contain infectious agents. Handle such samples with the greatest of care and in accordance with the required safety regulations. Always wear safety glasses, 2 pairs of gloves, and a lab coat. The responsible body (e.g., laboratory manager) must take the necessary precautions to ensure that the surrounding workplace is safe, and that the instrument operators are suitably trained and not exposed to hazardous levels of infectious agents as defined in the applicable Material Safety Data Sheets (MSDSs) or OSHA, ACGIH, or COSHH documents. Venting for fumes and disposal of wastes must be in accordance with all national, state, and local health and safety regulations and laws.

DE	**Infektiöses Probenmaterial** Proben, die mit Hilfe dieses Gerätes prozessiert werden, können infektiöse Agenzien enthalten. Die Probenhandhabung sollte aus diesem Grund mit größter Vorsicht und gemäß den anzuwendenden Sicherheitsbestimmungen erfolgen. Es sollten immer Sicherheitsbrille, zwei Paar Handschuhe und ein Laborkittel getragen werden. Der Betreiber der Anlage ist für die Gewährleistung der Sicherheit am Arbeitsplatz verantwortlich. Er hat sicherzustellen, dass die Bediener des Gerätes ausreichend geschult sind und der Umgang mit infektiösen Agenzien nicht das in den Sicherheitsdatenblättern oder in anderen zu beachtenden Dokumenten festgelegte Ausmaß überschreitet. Bei der Behandlung von Abluft und bei der Abfallbeseitigung sind alle gesetzlichen Regelungen zur Gesundheit und Sicherheit auf nationaler, regionaler und lokaler Ebene zu berücksichtigen.
FR	**Echantillons contenant des agents infectieux** Certains échantillons utilisés avec cet instrument peuvent contenir des agents infectieux. Manipuler ce type d'échantillon avec le plus grand soin et en accord avec les règles de sécurité requises. Toujours porter des lunettes de protection, deux paires de gants et une blouse de laboratoire. La personne responsable (par exemple le Chef du laboratoire) doit prendre les précautions nécessaires pour assurer la sécurité de l'environnement du poste de travail et pour être sûr que les opérateurs de l'instrument sont suffisamment formés et non exposés à des quantités dangereuses d'agents infectieux comme défini dans "Material Safety Data Sheets (MSDS)" ou des documents "OSHA, ACGIH ou COSHH". L'évacuation des vapeurs et déchets doit être conforme à tous règlements et dispositions légales - au plan national, départemental et local - concernant la santé et la sécurité.

WARNING	**Hazardous chemicals** [W8] Some chemicals used with this instrument may be hazardous or may become hazardous after completion of the protocol run. Always wear safety glasses, gloves, and a lab coat. The responsible body (e.g., laboratory manager) must take the necessary precautions to ensure that the surrounding workplace is safe and that the instrument operators are not exposed to hazardous levels of toxic substances (chemical or biological) as defined in the applicable Material Safety Data Sheets (MSDSs) or OSHA, ACGIH, or COSHH documents. Venting for fumes and disposal of wastes must be in accordance with all national, state, and local health and safety regulations and laws.
DE	**Gefährliche Chemikalien** Einige der in Verbindung mit diesem Gerät verwendeten Chemikalien sind gesundheitsgefährdend oder können nach Beendigung eines Protokoll-Durchlaufes gesundheits-gefährdend werden. Es sollten immer Sicherheitsbrille, Handschuhe und ein Laborkittel getragen werden. Der Betreiber der Anlage ist für die Gewährleistung der Sicherheit am Arbeitsplatz verantwortlich. Er hat sicherzustellen, dass die Bediener des Gerätes ausreichend geschult sind und nicht gesundheitsgefährdenden Konzentrationen toxischer Substanzen (chemischer oder biologischer) ausgesetzt sind, so wie dies in den Sicherheitsdatenblättern oder in anderen zu beachtenden Dokumenten festgelegt ist. Bei der Behandlung von Abluft und bei der Abfallbeseitigung sind alle gesetzlichen Regelungen zur Gesundheit und Sicherheit auf nationaler, regionaler und lokaler Ebene zu berücksichtigen.

FR	**Substances chimiques dangereuses** Certaines substances chimiques utilisées avec cet instrument peuvent être dangereuses ou peuvent le devenir après que le protocole ait été effectué. Toujours porter des lunettes de protection, paire de gants et une blouse de laboratoire. La personne responsable (par exemple le Chef du laboratoire) doit prendre les précautions nécessaires pour assurer la sécurité de l'environnement du poste de travail et pour être sûr que les opérateurs de l'instrument sont suffisamment formés et non exposés à des quantités dangereuses de substances toxiques (chimique ou biologique) comme défini dans "Material Safety Data Sheets (MSDS)" ou des documents "OSHA, ACGIH ou COSHH". L'évacuation des vapeurs et déchets doit être conforme à tous règlements et dispositions légales - au plan national, départemental et local - concernant la santé et la sécurité.

WARNING 	**Risk of fire** [W9] When cleaning the QIAcube with alcohol-based disinfectant, leave the QIAcube door open to allow flammable vapors to disperse. Only clean the QIAcube when worktable components have cooled down.
DE	**Feuergefahr** Beim Reinigen des QIAcube mit einem auf Alkohol basierenden Desinfektionsmittel muss die Tür des QIAcubes offen gelassen werden, damit die brennbaren Dämpfe entweichen können. Den QIAcube nur reinigen, sobald die entsprechenden Module auf der Arbeitsfläche abgekühlt sind.
FR	**Risque de feu** Lors du nettoyage du QIAcube avec un désinfectant à base d'alcool, laisser la porte du QIAcube ouverte pour permettre aux vapeurs inflammables de s'évaporer. Nettoyer le QIAcube uniquement quand les composants de la table de travail ont refroidi.

WARNING	**Toxic fumes** [W10] Do not use bleach to disinfect used labware. Bleach in contact with salts from the buffers used can produce toxic fumes.
DE	**Giftige Dämpfe/Gase** Für die Reinigung oder Desinfektion des Gerätes dürfen keine Bleichmittel verwendet werden. Durch den Kontakt von Bleichmitteln mit den Salzen der verwendeten Pufferlösungen kann es zur Bildung giftiger Gase oder Dämpfe kommen.
FR	**Vapeurs toxiques** Ne pas utiliser de l'eau de javel pour nettoyer ou désinfecter l'instrument. L'eau de javel en contact avec des tampons salins peut produire des fumées toxiques.

WARNING	**Moving parts** [W11] To avoid contact with moving parts during operation of the QIAcube, the instrument must be operated with the door closed. If the sensor is not functioning correctly, contact QIAGEN Technical Services.
DE	**Bewegliche Geräteteile** Während des Gerätelaufs ist jeglicher Kontakt mit den beweglichen Geräteteilen zu vermeiden; das Gerät darf ausschließlich bei geschlossener Tür in Betrieb genommen werden. Sollte der Sensor nicht ordnungsgemäß funktionieren, kontaktieren Sie bitten den Technischen Service von QIAGEN.
FR	**Eléments mobiles** Lorsque le QIAcube est en marche, toujours fermer la porte de l'instrument afin d'éviter tout contact avec les éléments mobiles de l'appareil. Si le détecteur ne fonctionne pas correctement, contacter le Support Technique QIAGEN.

WARNING	**Moving parts** [W12] In case of breakdown caused by power failure, remove the power cord and wait 10 minutes before attempting to manually open the centrifuge lid.
DE	**Bewegliche Geräteteile** Bei einem durch Stromausfall entstandenen Ausfall des Gerätes das Stromkabel entfernen und 10 Minuten warten bevor der Zentrifugendeckel manuell geöffnet werden kann.
FR	**Eléments mobiles** Dans le cas d'un arrêt causé par une panne de courant, retirer le câble d'alimentation et attendre 10 minutes avant d'essayer d'ouvrir manuellement le couvercle de la centrifugeuse.

WARNING	**Risk of personal injury and material damage** [W13] Raise the centrifuge lid carefully. The lid is heavy and may cause injury if it falls down.
DE	**Verletzungsgefahr und Beschädigung des Gerätes** Den Zentrifugendeckel vorsichtig anheben. Der Deckel ist schwer und kann Verletzungen verursachen falls er herunterfällt.
FR	**Risque de dommages corporels et matériels** Soulever le couvercle de la centrifugeuse avec précaution. Le couvercle est lourd et peut causer des blessures si il tombe.

WARNING	**Risk of overheating** [W14] To ensure proper ventilation, maintain a minimum clearance of 10 cm at the sides and rear of the QIAcube. Slits and openings that ensure the ventilation of the QIAcube must not be covered.

DE	**Überhitzung des Gerätes** Zur Sicherstellung einer ausreichenden Belüftung des QIAcube muss ein Mindestabstand von 10 cm an den Seiten und an der Rückseite des Gerätes eingehalten werden. Lüftungsschlitze und –öffnungen des Gerätes nicht abdecken.
FR	**Risque de surchauffe** Laisser un espace d'au moins 10 cm sur les côtés et à l'arrière du QIAcube pour assurer une ventilation efficace. Les grilles et prises d'air assurant la ventilation du QIAcube ne doivent pas être couvertes.

WARNING	**Hot surface** [W15] The shaker can reach temperatures of up to 70°C (158°F). Avoid touching it when it is hot.
DE	**Heiße Oberfläche** Der Schüttler kann Temperaturen bis zu 70°C (158°F) erreichen. Vermeiden Sie es den Schüttler zu berühren, solange er heiß ist.
FR	**Surface brûlante** L'agitateur peut atteindre des températures jusqu'à 70°C (158°F). Eviter de le toucher quand il est chaud.

WARNING	**Risk of personal injury and material damage** [W16] Do not use damaged rotor adapters. The rotor adapters are for single use only. Do not reuse the rotor adapters as they can be damaged by the high *g* forces experienced in the centrifuge.
DE	**Verletzungsgefahr und Beschädigung des Gerätes** Benutzen Sie keine beschädigten Rotoradapter. Rotoradapter sind nur für den Einmalgebrauch. Benutzen Sie die Rotoradapter kein zweites Mal, da sie durch die hohen *g* Kräfte bei der Zentrifugation beschädigt werden können.

FR	**Risque de dommages corporels et matériels** Ne pas utiliser d'adaptateur à rotor endommagé. Les adaptateurs à rotor sont faits que pour une seule utilisation. Ne pas les utiliser une deuxième fois car ils peuvent être endommagés par les hautes forces *g* de la centrifugation.

WARNING 	**Risk of personal injury and material damage** [w17] The rotor nut must be securely tightened using the rotor key supplied with QIAcube. If the rotor nut is not tightened properly, it can become loose during operation of the centrifuge.
DE	**Verletzungsgefahr und Beschädigung des Gerätes** Die Rotorschraube muss zur Sicherheit mit dem Rotorschlüssel angezogen werden, der zusammen mit dem QIAcube geliefert wird. Sollte die Schraube nicht fest genug angezogen sein, kann sie sich während der Zentrifugation lösen.
FR	**Risque de dommages corporels et matériels** La vis du rotor doit être proprement serrée à l'aide de la clé du rotor fournie avec le QIAcube. Si la vis n'est pas assez serrée, elle peut se desserrer lorsque la centrifugeuse est en marche.

WARNING 	**Risk of personal injury and material damage** [W18] Make sure that lids from spin columns and 1.5 ml microcentrifuge tubes are in the correct position and pushed all the way down to the bottom of the slots on the sides of the of the rotor adapter. Incorrectly positioned lids can break off during centrifugation.
DE	**Verletzungsgefahr und Beschädigung des Gerätes** Stellen Sie sicher, dass die Deckel von den Spin-Säulen und den 1,5 ml Mikrozentrifugationsröhrchen in der korrekten Position angebracht sind und bis zum Boden des Deckelschachts an den Seiten des Rotor-Adapters durchgedrückt sind. Falsch positionierte Deckel können während der Zentrifugation abgerissen werden.

FR	**Risque de dommages corporels et matériels** Assurez-vous de positionner correctement les couvercles des colonnes de centrifugation et des tubes de 1,5 ml et de les enfoncer jusqu'au bout de l'emplacement sur les bords de l'adaptateur à rotor. Les couvercles placés incorrectement peuvent se casser lors de la centrifugation.

WARNING 	**Risk of personal injury and material damage** [W19] Be sure the lid is completely removed from the spin column. Spin columns with partially removed lids may not be removed properly from the rotor, causing the protocol run to crash.
DE	**Verletzungsgefahr und Beschädigung des Gerätes** Stellen Sie sicher, dass der Deckel von der Spin-Säule abgetrennt ist. Spin-Säulen mit unvollständig entfernten Deckeln lassen sich nicht korrekt aus dem Rotor entnehmen, was einen Protokollabbruch zur Folge hätte.
FR	**Risque de dommages corporels et matériels** Assurez-vous d'enlever les couvercles des colonnes de centrifugation. Les colonnes de centrifugations avec un couvercle partiellement enlevé se détachent difficilement du rotor ce qui est la cause d'un crash du protocole.

WARNING 	**Risk of material damage** [W20] Do not use 1.5 ml microcentrifuge tubes on the shaker. Because 1.5 ml microcentrifuge tubes can cause filter-tips to stick during sample transfer, their use on the shaker can damage the pipetting system and can cause a centrifuge crash.
DE	**Beschädigung des Gerätes** Benutzen Sie keine Mikrozentrifugationsröhrchen (1,5 ml) auf dem Schüttler. Mikrozentrifugationsröhrchen können dazu führen, dass Filter-Tips während des Probentransfers steckenbleiben. Die Benutzung dieser Röhrchen auf dem Schüttler kann daher das Pipettiersystem beschädigen und einen Zentrifugenunfall verursachen.

FR	**Risque de dommages matériels** Ne pas utiliser de tubes de centrifugation d'1,5 ml sur l'agitateur. Pendant le transfert des échantillons les tubes de centrifugation peuvent bloquer les cônes à filtre. L'usage des tubes sur l'agitateur peut donc abîmer le système de pipetage et causer une panne de la centrifugeuse.

WARNING 	**Risk of electric shock** [W21] Do not open any panels on the QIAcube. **Risk of personal injury and material damage** Only perform maintenance that is specifically described in this user manual.
DE	**Gefährdung durch Elektrizität** Unter keinen Umständen darf das Gehäuse des QIAcube geöffnet werden. **Verletzungsgefahr und Beschädigung des Gerätes** Keine Pflege- und Wartungsarbeiten durchführen, die nicht in diesem Handbuch beschrieben sind.
FR	**Risque d'électrocution** Ne pas ouvrir les panneaux du QIAcube. **Risque de dommages personnels et matériels** Réaliser uniquement la maintenance décrite spécifiquement dans ce manuel.

WARNING 	**Hazardous chemicals and infectious agents** [W22] The waste contains samples and reagents. This waste may contain toxic or infectious material and must be disposed of properly. Refer to your local safety regulations for proper disposal procedures.
DE	**Gefährliche Chemikalien und infektiöse Agenzien** Der Abfall kann gesundheitsgefährdende Reagenzien oder infektiöses Probenmaterial enthalten und muss gemäß den lokalen Sicherheitsvorschriften entsorgt werden.

FR	**Agents infectieux et substances chimiques dangereuses** Les déchets contiennent des échantillons et des réactifs. Ils peuvent contenir des agents infectieux et doivent être éliminés selon les règles de sécurité de votre laboratoire.

WARNING 	**Risk of personal injury** [W23] After a plastic crash, sharp plastic particles could be inside the centrifuge. Be careful when handling items inside the centrifuge.
DE	**Verletzungsgefahr** Sollten Plastikteile beschädigt sein, können sich scharfe Plastikstücke innerhalb der Zentrifuge befinden. Bei der Benutzung von Gegenständen innerhalb der Zentrifuge ist daher Vorsicht angebracht.
FR	**Risque de dommages corporels** Si du plastique s'est cassé, des morceaux pointus peuvent se trouver à l'intérieur de la centrifugeuse. Soyez attentifs lors de la manipulation de matériel à l'intérieur de la centrifugeuse.

CAUTION 	The term CAUTION is used to inform you about situations that could result in **damage to the workstation** or other equipment. Details about these circumstances are given in a box like this one.
DE	**CAUTION (ACHTUNG)** ACHTUNG weist auf Situationen und Umstände hin, die zu einer Beschädigung des Gerätes führen können. Um einen **Geräteschaden** zu vermeiden, muss die genannte Anleitung unbedingt befolgt werden. Nähere Angaben zu der Art der Gefährdung und der Vermeidung solcher Situationen werden in einem Textfeld wie diesem gemacht.

FR	**CAUTION (ATTENTION)** Le terme CAUTION (Attention) est utilisé pour signaler les situations susceptibles de provoquer des **détériorations de l'instrument** ou d'autre matériel. Les détails sur ces circonstances figurent dans un encadré semblable à celui-ci.

CAUTION	**Damage to the instrument** [C1] Avoid spilling water or chemicals onto the QIAcube. Damage caused by water or chemical spillage will void your warranty.
DE	**Beschädigung des Gerätes** Vermeiden Sie es, Wasser oder Chemikalien auf dem QIAcube zu verschütten. Durch verschüttetes Wasser oder verschüttete Chemikalien verursachte Geräteschäden sind nicht durch die Garantie abgedeckt.
FR	**Déterioration de l'appareil** Eviter de renverser de l'eau ou des substances chimiques sur le QIAcube. Tout dommage causé par de l'eau ou des produits chimiques mettra fin à la garantie.

CAUTION	**Damage to the instrument** [C2] Only use QIAGEN spin columns and QIAGEN Spin Kits with the QIAcube. Damage caused by use of other types of spin columns or chemistries will void your warranty.
DE	**Beschädigung des Gerätes** Es dürfen ausschließlich QIAGEN Spin-Säulen und QIAGEN Spin-Kits auf dem QIAcube benutzt werden. Geräteschäden, die durch die Verwendung von anderen Spin-Säulen oder Chemie-Typen verursacht werden, sind nicht durch die Garantie abgedeckt.
FR	**Déterioration de l'instrument** Utiliser uniquement des colonnes de centrifugation et des kits QIAGEN avec le QIAcube. Tout dommage causé par l'utilisation d'un autre type de colonnes ou de chimie mettra fin à la garantie.

CAUTION	**Damage to the instrument** [C3] Direct sunlight may bleach parts of the instrument and cause damage to plastic parts. The QIAcube must be located out of direct sunlight.
DE	**Beschädigung des Gerätes** Direktes Sonnenlicht kann Teile des Gerätes bleichen und Plastikteile schädigen. Der QIAcube darf nicht ins direkte Sonnenlicht gestellt werden.
FR	**Détérioration de l'instrument** La lumière directe du soleil peut décolorer des parties de l'instrument et endommager des parties en plastique. Placer le QIAcube en dehors de la lumière directe du soleil.

CAUTION	**Damage to the instrument** [C4] The QIAcube must not be used if the centrifuge lid is broken or if the lid lock is damaged. Make sure that the rotor is installed correctly and that all buckets are properly mounted, even if processing fewer than 12 samples. Load the rotor symmetrically. Only use rotors, buckets, and consumables designed for use with the QIAcube.
DE	**Beschädigung des Gerätes** Bei Beschädigung des Zentrifugendeckels oder Zentrifugenschlosses darf der QIAcube nicht benutzt werden. Stellen Sie sicher, dass der Rotor korrekt installiert ist und dass sämtliche Zentrifugenbecher ordnungsgemäß montiert sind, auch bei Verarbeitung von weniger als 12 Proben. Den Rotor symmetrisch beladen. Ausschließlich Rotoren, Zentrifugenbecher und Reagenzien benutzen, die auf den QIAcube angepasst sind.

FR	**Dommage de l'appareil** Ne pas utiliser le QIAcube lorsque le couvercle de la centrifugeuse est cassé ou que la fermeture du couvercle est endommagée. S'assurer que le rotor est installé correctement et que tous les godets sont bien montés, même si vous traitez moins de 12 échantillons. Charger le rotor symétriquement.

CAUTION 	**Damage to the instrument** [C5] Do not use bleach, solvents, or reagents containing acids, alkalis, or abrasives to clean the QIAcube.
DE	**Beschädigung des Gerätes** Es dürfen weder Bleiche noch säure- oder laugehaltige Reinigungs- oder Scheuermittel benutzt werden.
FR	**Déterioration de l'appareil** Ne pas utiliser d'eau de Javel, de solvants ou de réactifs contenant des acides, des substances alcalines ou abrasives pour nettoyer le QIAcube.

CAUTION 	**Damage to the instrument** [C6] Do not use detergents, alcohol, or alcohol-based disinfectants to clean the QIAcube door.
DE	**Beschädigung des Gerätes** Zur Reinigung der QIAcube Tür keine Detergenzien oder auf Alkohol basierenden Reinigungsmittel benutzen.
FR	**Détérioration de l'appareil** Ne pas utiliser de détergents ou de désinfectants à base d'alcool pour nettoyer la porte du QIAcube.

1.10 Symbols on the QIAcube

Symbol	Location	Language	Description
	Shaker	EN	Heat hazard — the temperature of the shaker can reach up to 70°C (158°F).
	Schüttler	DE	Verbrennungsgefahr — die Temperatur des Schüttlers kann bis zu 70°C (158°C) heiß werden.
	Agitateur	FR	Risque de brûlures — la température de l'agitateur peut atteindre jusqu'à 70°C (158 °F).
	Near the centrifuge; near the robotic arm	EN	Mechanical hazard — avoid contact with moving parts.
	Nahe der Zentrifuge; nahe des Roboterarms	DE	Mechanische Gefahr — Kontakt mit beweglichen Geräteteilen vermeiden.
	Près de la centrifugeuse; près du bras robotique	FR	Danger mécanique — éviter d'entrer en contact avec les parties mobiles.

Symbol	Location	Language	Description
	Inside the waste drawer	EN	Biohazard — the waste drawer may be contaminated with biohazardous material and must be handled with gloves.
	Innerhalb des Abfallbehälters	DE	Biologische Gefährdung — der Abfallbehälter kann durch biologisch gefährliches Material kontaminiert sein und muss mit Handschuhen angefasst werden.
	A l'intérieur du compartiment à déchets	FR	Danger Biologique — le compartiment à déchets peut être contaminé par du matériel présentant un risque biologique et doit être manipulé avec des gants.
CE	Type plate on the back of the instrument	EN	CE mark
	Plakette auf der Rückseite des Gerätes	DE	CE-Zeichen
	Plaque à l'arrière de l'appareil	FR	Marquage CE

Symbol	Location	Language	Description
	Type plate on the back of the instrument	EN	CSA listing mark for Canada and the USA
	Plakette auf der Rückseite des Gerätes	DE	CSA-Zeichen für Kanada und die USA
	Plaque à l'arrière de l'appareil	FR	Marquage CSA pour le Canada et les Etats-Unis
CB	Type plate on the back of the instrument	EN	CB mark of the IECEE member states
	Plakette auf der Rückseite des Gerätes	DE	CB-Zeichen der IECEE-Mitgliedsstaaten
	Plaque à l'arrière de l'appareil	FR	Marquage CB des Etats membres de l'IECEE
FC	Type plate on the back of the instrument	EN	FCC mark of the United States Federal Communications Commission
	Plakette auf der Rückseite des Gerätes	DE	FCC Markierung der Federal Communications Kommission der USA
	Plaque à l'arrière de l'appareil	FR	Marquage FCC de la commission fédérale des communications des Etats Unis

Symbol	Location	Language	Description
	Type plate on the back of the instrument	EN	C-Tick mark for Australia (supplier identification N17965)
	Plakette auf der Rückseite des Gerätes	DE	C-Tick Markierung für Australien (Hersteller-Identifikation N17965)
	Plaque à l'arrière de l'appareil	FR	Etiquette C-Tick pour l'Australie (Identification du fournisseur N17965)
	Type plate on the back of the instrument	EN	RoHS mark for China (the restriction of the use of certain hazardous substances in electrical and electronic equipment)
	Plakette auf der Rückseite des Gerätes	DE	RoHS Markierung für China (Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten)
	Plaque à l'arrière de l'appareil	FR	Marquage RoHS pour la Chine (limitation de l'utilisation de certaines substances dangereuses dans les équipements électriques et électroniques)

Symbol	Location	Language	Description
	Type plate on the back of the instrument	EN	WEEE mark for Europe
	Plakette auf der Rückseite des Gerätes	DE	WEEE-Zeichen für Europa
	Plaque à l'arrière de l'appareil	FR	Marquage WEEE pour l'Europe

2 Introduction

Thank you for choosing the QIAcube. We are confident it will become an integral part of your laboratory.

Before using the QIAcube, it is essential that you read this user manual carefully and pay particular attention to the safety information. The instructions and safety information in the user manual must be followed to ensure safe operation of the instrument and to maintain the instrument in a safe condition.

2.1 About this user manual

This user manual provides information about the QIAcube in the following sections:

1. Safety Information
2. Introduction
3. General Description
4. Installation Procedures
5. Operating Procedures
6. Maintenance Procedures
7. Troubleshooting
8. Glossary

   Appendices

   Index

The appendices contain the following:

- Technical data
- Information about loading the centrifuge and shaker
- QIAcube accessories
- Liability clause

2.2 General information

2.2.1 Technical assistance

At QIAGEN we pride ourselves on the quality and availability of our technical support. Our Technical Services Departments are staffed by experienced scientists with extensive practical and theoretical expertise in molecular biology and the use of QIAGEN products. If you have any questions or experience any difficulties regarding the QIAcube or QIAGEN products in general, do not hesitate to contact us.

QIAGEN customers are a major source of information regarding advanced or specialized uses of our products. This information is helpful to other scientists as well as to the researchers at QIAGEN. We therefore encourage you to contact us if you have any suggestions about product performance or new applications and techniques.

For technical assistance and more information, call one of the QIAGEN Technical Services Departments or local distributors (see back cover).

For up-to-date information about the QIAcube, including new protocols for download, visit www.qiagen.com/MyQIAcube .

2.2.2 Policy statement

It is the policy of QIAGEN to improve products as new techniques and components become available. QIAGEN reserves the right to change specifications at any time.

In an effort to produce useful and appropriate documentation, we appreciate your comments on this user manual. Please contact QIAGEN Technical Services.

2.2.3 Version management

This document is the *QIAcube User Manual*, version 1.1.

2.3 Intended use of the QIAcube

The QIAcube is designed to perform fully automated purification of nucleic acids and proteins in molecular biology applications. The system is intended for use by professional users, such as technicians and physicians trained in molecular biological techniques and the operation of the QIAcube.

The QIAcube is intended to be used only in combination with QIAGEN kits indicated for use with the QIAcube for the applications described in the kit handbooks.

2.3.1 Requirements for QIAcube users

The table on the next page covers the general level of competence and training necessary for transportation, installation, use, maintenance, and servicing of the QIAcube.

Task	Personnel	Training and experience
Transportation	No special requirements	No special requirements
Installation	Laboratory technicians or equivalent	Appropriately trained and experienced personnel familiar with use of computers and automation in general
Routine use (running protocols)	Laboratory technicians or equivalent	Appropriately trained and experienced personnel familiar with use of computers and automation in general
Maintenance procedures	Laboratory technicians or equivalent	Appropriately trained and experienced personnel familiar with use of computers and automation in general
Servicing	**QIAGEN Field Service Specialists only**	

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3 General Description

The QIAcube performs fully automated processing of up to 12 samples. The instrument controls integrated components including a centrifuge, heated shaker, pipetting system, and robotic gripper.

The QIAcube is preinstalled with various protocols for processing QIAGEN spin columns for purification of RNA, genomic DNA, plasmid DNA, viral nucleic acids, or proteins, plus DNA and RNA cleanup. The user selects a protocol using the touchscreen, and loads plasticware, samples, and reagents onto the QIAcube worktable. The user then closes the instrument door and starts the protocol, which provides all necessary commands for sample lysis and purification using QIAGEN spin columns. A fully automated load check helps to ensure correct loading of the worktable.

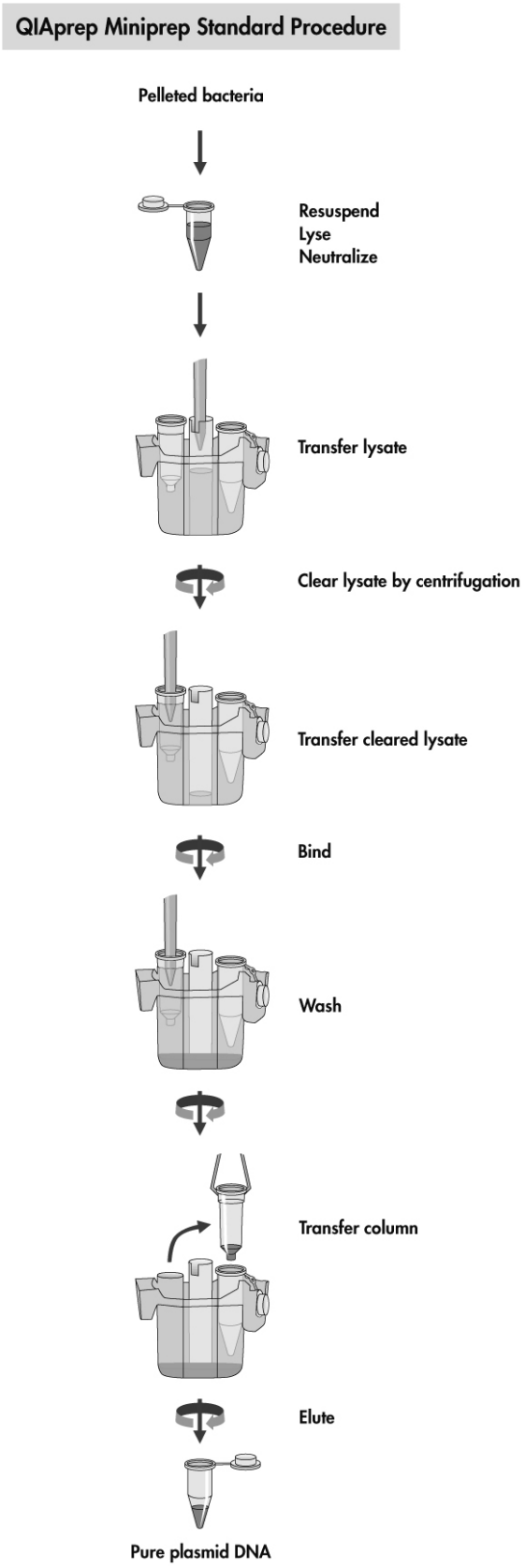
The range of protocols available is continually expanding, and additional QIAGEN protocols can be downloaded free of charge at www.qiagen.com/MyQIAcube .

3.1 QIAcube principle

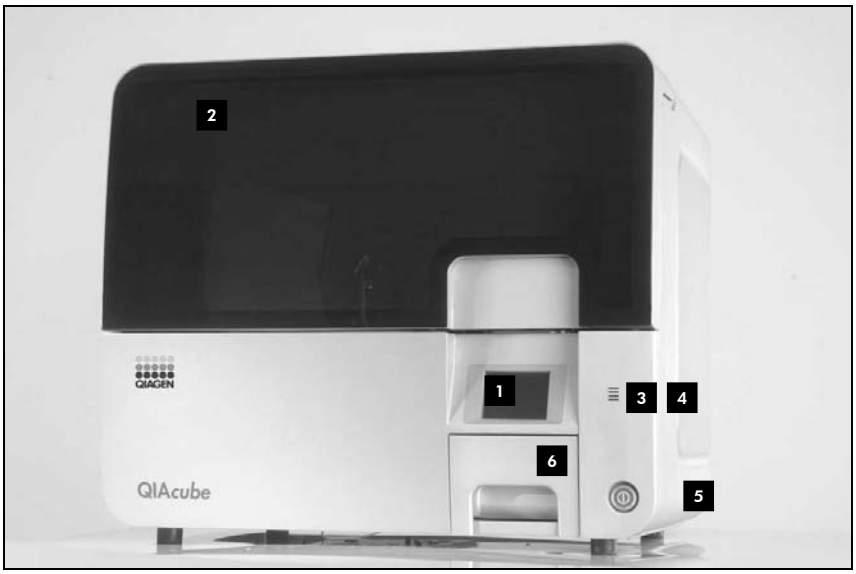
Sample preparation using the QIAcube follows the same steps as the manual procedure (i.e., lyse, bind, wash, and elute). No change in purification chemistry is required as you simply continue to use trusted QIAGEN spin-column kits.

1. Samples are lysed in the orbital shaker, which can be heated if required by the protocol.
2. Each lysate is transferred to a spin column in a rotor adapter. If the lysate needs to be homogenized or cleared, it is first transferred to the middle position of the rotor adapter.
3. Nucleic acids or proteins bind to the silica membrane or purification resin of the QIAGEN spin column and are washed to remove contaminants.
4. The spin column is transferred to a microcentrifuge tube for elution of purified nucleic acids or protein.

For an example workflow using a QIAGEN spin-column kit, see the flowchart on the next page.


QIAprep Miniprep Standard Procedure
Pelleted bacteria
Resuspend
Lyse
Neutralize
Transfer lysate
Clear lysate by centrifugation
Transfer cleared lysate
Bind
Wash
Transfer column
Elute
Pure plasmid DNA

3.2 External features of the QIAcube



Front view of the QIAcube.

1. Touchscreen
2. Door
3. RS232 serial port behind protective panel (for use by QIAGEN Field Service Specialists only)
4. USB port behind protective panel
5. Power switch
6. Waste drawer

Touchscreen

The touchscreen allows the user to select and run protocols, install or delete protocols, save data files, and operate the shaker and centrifuge individually. Messages displayed in the touchscreen guide the user through worktable setup after a protocol has been selected. During sample processing, the touchscreen shows the protocol status and remaining time. For convenience and ease of use, the names of the last 2 protocols performed are displayed in the main menu, enabling rapid selection of frequently used protocols.

Button	Description
Cleanup	Displays protocols for clean up of DNA from amplification reactions and agarose gels or clean up of RNA
DNA	Displays protocols for genomic or plasmid DNA purification
Protein	Displays protocols for protein purification and protein depletion
RNA	Displays protocols for RNA purification
Virus	Displays protocols for viral nucleic acid purification
Tools	Displays additional functions

Door

The QIAcube door protects users from the moving robotic arm and from potentially infectious material placed on the worktable. The door can be manually opened to gain access to the worktable. During operation of the QIAcube, the door must remain closed and should only be opened when instructed to do so by the software. If the door is opened during a protocol run, the protocol run will immediately stop and an error message will be displayed in the touchscreen. The samples must then be processed manually.

RS232 serial port

The RS232 serial port, located behind the protective panel, is for use by QIAGEN Field Service Specialists only.

USB port

The USB port, located behind the protective panel, allows connection of the QIAcube to a USB stick (supplied with the QIAcube). New protocols and software versions, available at www.qiagen.com/MyQIAcube , can be downloaded to the USB stick and transferred to the QIAcube via the USB port. Data files, such as log files or report files can also be

transferred via the USB port from the QIAcube to the USB stick.

Important: The USB port is only for use with the USB stick provided by QIAGEN. Do not connect other devices to this port.

Important: Do not remove the USB stick while downloading protocols or software or transferring data files or during a protocol run.

Power switch

The power switch is located at the front right of the QIAcube. To switch the QIAcube on, press the switch. The beeper sounds, and the startup screen appears. The instrument then automatically performs initialization tests.

To conserve energy, the QIAcube can be switched off when not in use. To switch off the QIAcube, press the switch.

Waste drawer

Used disposable filter-tips are discarded through 2 slots in the worktable and collected in the waste drawer. Used columns (e.g., QIAshredder columns) are also discarded into this drawer.

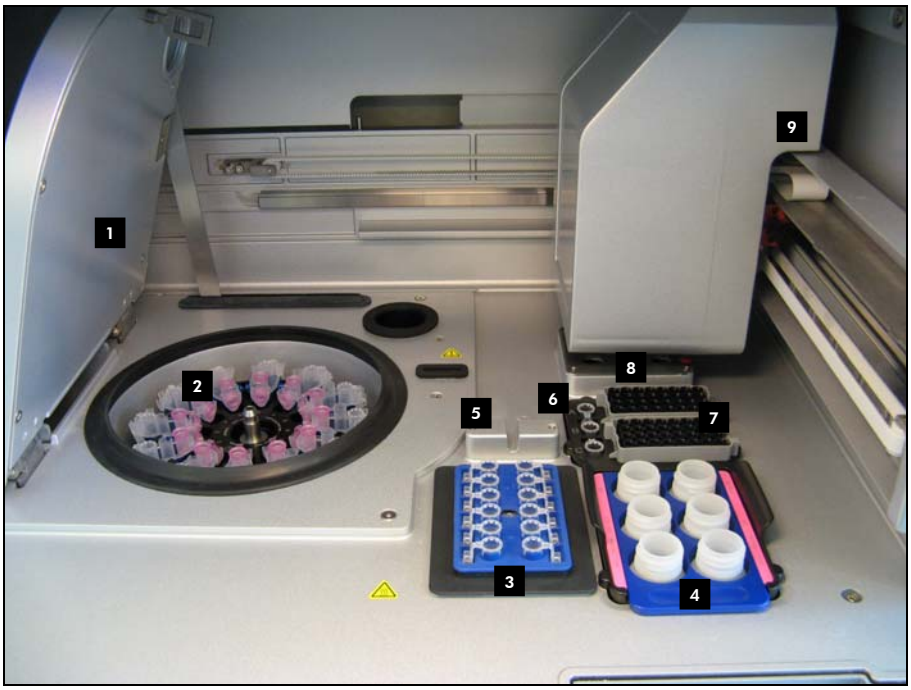
Power cord socket

The power cord socket is located at the rear right of the QIAcube and allows connection of the QIAcube to a power outlet via the supplied power cord.

Cooling air outlet

Cooling air outlets are located at the left side of the QIAcube and allow cooling of the internal components of the QIAcube.

3.3 Internal features of the QIAcube



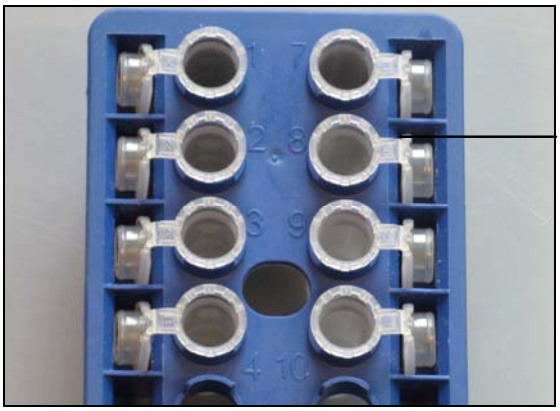
Internal view of the QIAcube.

1. Centrifuge lid
2. Centrifuge
3. Shaker
4. Reagent bottle rack
5. Tip sensor
6. Microcentrifuge tube slots
7. Tip racks
8. Disposal slots for tips and columns
9. Robotic arm

Shaker

The heated orbital shaker enables fully automated lysis of up to 12 samples. Shaker adapters are available for 2 ml microcentrifuge tubes and 2 ml screw-cap tubes. Sample tubes are placed into a rack that fits onto the shaker adapter. The lid of each microcentrifuge tube or shaker rack plug of each screw-cap tube is held in a slot at the edge of the shaker rack. This ensures that microcentrifuge tubes cannot be displaced during sample processing and allows shaker

loading to be checked. The positions on the shaker rack are numbered to enable easy loading.



Shaker rack.

The shaker can also be operated individually via the touchscreen.

Centrifuge

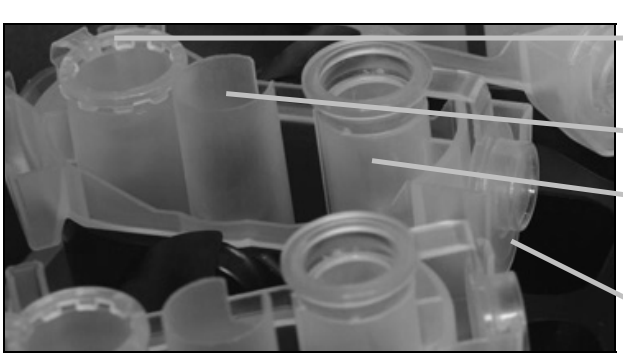
The centrifuge is equipped with 12 swing-out buckets, each of which can hold a disposable rotor adapter. Up to 12 samples can be processed per run. For ease of use and high process safety, a gray line marks the side of the bucket that must face toward the center of the rotor. All centrifuge buckets must be mounted before starting a protocol run, even if fewer than 12 samples are to be processed. For more information, see Appendix B or the loading chart available at www.qiagen.com/MyQIAcube .

The centrifuge can also be operated individually via the touchscreen.

Rotor adapter

A disposable rotor adapter holds a QIAGEN spin column and a microcentrifuge tube in a centrifuge bucket during sample processing. If required by the protocol, an additional column (e.g., QIAshredder column) can be placed in the middle position of the rotor adapter. For ease of use and high process safety, the rotor adapters are designed so that they fit into a centrifuge bucket only in the correct orientation.

Spin column and microcentrifuge tube lids are held securely in slots at the edge of the rotor adapter.



Novel rotor adapters.

The wash position of the rotor adapter is open at the bottom, enabling wash buffers to flow through and collect at the bottom of the rotor adapter during centrifugation. The other 2 positions in the rotor adapter are closed. If processing fewer than 12 samples, make sure to load the rotor symmetrically with rotor adapters. For more information, see Appendix B or the loading chart available at www.qiagen.com/MyQIAcube .

WARNING	**Risk of personal injury and material damage** [W16] Do not use damaged rotor adapters. The rotor adapters are for single use only. Do not reuse the rotor adapters as they can be damaged by the high *g* forces experienced in the centrifuge.

Reagent bottle rack

The reagent bottle rack holds up to six 30 ml reagent bottles and, for ease of use and high process safety, fits onto the QIAcube worktable only in the correct orientation. Liquid is aspirated from the bottles by the pipetting system. An application-specific labeling strip must be attached to the reagent bottle rack. For increased convenience and ease of use, the labeling strip fits only in the correct orientation on the reagent bottle rack. The use of the labeling strip allows easy identification of buffer positions and ensures that the

rack is correctly positioned on the worktable for liquid-level detection.

Note: Reagent bottles designed for use with the QIAcube must be used otherwise errors may occur during liquid detection.

Reagent bottle rack with labeling strips.

Tip racks

Two tip racks can be placed on the QIAcube worktable. Tips can be purchased in prefilled tip racks holding 200 µl filter-tips, 1000 µl filter-tips, or 1000 µl wide-bore filter-tips. Two tip racks can be placed on the QIAcube.

Note: Filter-tips designed for use with the QIAcube must be used.

Microcentrifuge tube slots

In addition to the 12 tubes that the shaker can accommodate, up to 3 additional microcentrifuge tubes can be used in the microcentrifuge accessory position. These slots can be used if, for example, proteinase K or other enzyme is required for the purification protocol.

Tip disposal slots

Disposable filter-tips are alternately discarded through each of the tip disposal slots into the waste drawer. This prevents discarded tips from piling up in the waste drawer.

Column disposal slot

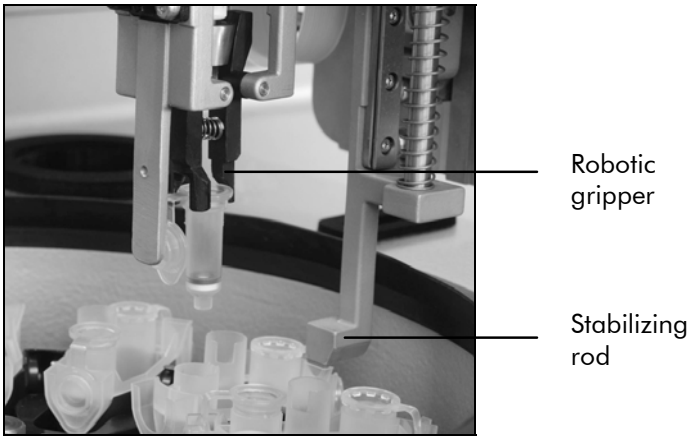
Used columns (e.g., QIAshredder columns) are discarded through this slot into the waste drawer.

Robotic arm

The robotic arm provides accurate and precise positioning of the robotic gripper and pipetting system on the QIAcube worktable and also includes the optical and ultrasonic sensor.

Robotic gripper

The robotic gripper transfers spin columns during sample preparation. During transfer of a spin column, a stabilizing rod holds the rotor adapter in place, ensuring it remains properly seated in the centrifuge bucket. The robotic gripper is behind the panel covering the robotic arm.



Fully automated spin-column processing.

Pipetting system

The QIAcube is equipped with a single-channel pipetting system that moves in the X, Y, and Z directions. The dilutor,

fitted with a tip adapter, is connected to a precision syringe pump, which enables accurate transfer of liquids. The tip adapter allows aspiration and dispensing of liquid through an attached disposable tip. Disposable filter-tips (200 µl, 1000 µl, or 1000 µl wide-bore) are used for sample preparation to minimize the risk of cross-contamination.

Optical sensor

During the load check, the optical sensor checks that the number of rotor adapters corresponds to the number of samples in the shaker and that both shaker and rotor are correctly loaded. The optical sensor also checks the type of tips loaded on the worktable and whether there are sufficient tips for the protocol run.

Note: The shaker and centrifuge must be symmetrically loaded (see Appendix B or the loading chart available at www.qiagen.com/MyQIAcube).

Ultrasonic sensor

During the load check, the ultrasonic sensor checks that the buffer bottles in the reagent bottle rack contain sufficient buffer for the protocol run.

Tip sensor

During sample preparation, the tip sensor checks that the tip adapter has picked up a tip and checks whether it is a 200 µl, or a 1000 µl type filter-tip.

4 Installation Procedures

This section provides instructions on unpacking, packing, and installing the QIAcube.

4.1 Requirements

Site

The QIAcube must be located out of direct sunlight, away from heat sources, and away from sources of vibration and electrical interference. Refer to Appendix A for the operating conditions (temperature and humidity). The site of installation should be free of excessive drafts, excessive moisture, and excessive dust and should not be subject to large temperature fluctuations.

Use a level workbench that is large enough and strong enough to accommodate the QIAcube. Refer to Appendix A for the weight and dimensions of the QIAcube.

Ensure that the workbench is dry, clean, and vibration-proof and has additional space for accessories.

The QIAcube must be placed within approximately 1.5 m of a properly grounded (earthed) AC power outlet. The power line to the instrument should be voltage regulated and surge protected.

WARNING	**Explosive atmosphere** [W5] The QIAcube is not designed for use in an explosive atmosphere.

WARNING	**Risk of overheating** [W14] To ensure proper ventilation, maintain a minimum clearance of 10 cm at the sides and rear of the QIAcube. Slits and openings that ensure the ventilation of the QIAcube must not be covered.

4.2 AC power connection

Power requirements

The QIAcube operates at:

- 100–120 V AC, 50/60 Hz, 650 VA (North America and Japan)
- 220–240 V AC, 50/60 Hz, 650 VA (Europe)

Make sure that the voltage rating of the QIAcube is compatible with the AC voltage available at the installation site. Mains supply voltage fluctuations are not to exceed 10% of nominal supply voltages.

Grounding requirements

To protect operating personnel, the National Electrical Manufacturers' Association (NEMA) recommends that the QIAcube be correctly grounded (earthed). The instrument is equipped with a 3-conductor AC power cord that, when connected to an appropriate AC power outlet, grounds (earths) the instrument. To preserve this protection feature, do not operate the instrument from an AC power outlet that has no ground (earth) connection.

Installation of AC power cord

Connect one end of the AC power cord to the socket located at the rear of the QIAcube, and the other end to the AC power outlet.

4.3 Unpacking the QIAcube

WARNING	**Risk of personal injury and material damage** [W2] The QIAcube is too heavy to be lifted by one person. To avoid personal injury or damage to the instrument, do not lift the instrument alone.

Before unpacking the QIAcube, move the package to the site of installation and check that the arrows on the package point upward. In addition, check whether the package is damaged. In case of damage, contact the transporter of the package. The shockwatch/tiltwatch indicator should be white. If it is red, broken, or missing, contact the transporter of the package.

Open the top of the transportation box to remove the centrifuge rotor, *QIAcube User Manual*, and power cord before lifting the box. If the box is lifted before the rotor has been removed, the rotor could fall to the ground and become damaged.

Remove the black foam protector lid and lift up the box.

When lifting the QIAcube, slide your fingers under both sides of the workstation and keep your back straight.

After unpacking the QIAcube, check that the following documents are supplied:

- Packing list
- Warranty registration form
- *QIAcube User Manual*

Read the packing list to check that you have received all items. If anything is missing, contact QIAGEN Technical Services.

Check that the QIAcube is not damaged and that there are no loose parts. If anything is damaged, contact QIAGEN Technical Services. Make sure that the QIAcube has equilibrated to ambient temperature before operating it.

Retain the package in case you need to transport the QIAcube in the future. Instructions for packing the QIAcube are given in Section 4.5, page 4-7. Using the original package minimizes damage during transportation of the QIAcube.

4.4 Installing the QIAcube

Before operating the QIAcube:

- Remove the QIAcube accessories.
- Carefully peel off the protective film from the QIAcube door.
- Remove the protector for the X- and Y-axes.
- Connect the power cord to the back of the QIAcube.
- Switch on the QIAcube.
- The centrifuge rotor and buckets must be installed.

Remove QIAcube accessories

Remove the *QIAcube User Manual*, power cord, and the centrifuge rotor and buckets from the foam packing material on top of the QIAcube.

Remove the USB stick, rotor key, rotor nut, Allen key, S2 shaker adapter, and shaker rack plugs from the waste drawer.

Removing the protective film from the QIAcube door

Carefully peel off the protective film from the QIAcube door.

Remove the foam protector

During transportation, a foam protector prevents the movable parts of the QIAcube from moving along the X- and Y-axes. Before using the instrument, this protector must be removed.

Foam protector.

Remove the foam protector as follows:
Gently pull the foam protector towards you to remove it (see picture above). After removing the protector for the X- and Y-axes, make sure to close the QIAcube door.

Installation of AC power cord

1. Remove the power cord from the foam packing material on top of the QIAcube. Ensure that the power switch is set to the off position.
2. Check that the voltage rating on the label at the back of the QIAcube matches the voltage available at the installation site.
3. Plug the power cord into the power-cord socket.
4. Plug the power cord into a grounded power outlet.

Switching on the QIAcube

Check that the QIAcube operates properly:

1. Make sure that the door of the QIAcube is closed.
2. Switch on the QIAcube using the power switch. The following events occur in the order shown:
   - The beeper sounds and the startup screen appears.
   - The instrument automatically performs initialization tests.
   - The centrifuge lid opens.

If there is an initialization error, check that the power cord is properly connected to the QIAcube and power outlet. Retry the initialization process. If the problem persists, contact QIAGEN Technical Services.

Note: If you switched on the QIAcube before closing the door, the instrument will not perform an initialization and the centrifuge lid will not open. Switch off the QIAcube, close the door, and then switch on the QIAcube again.

Installing the centrifuge rotor and buckets

The rotor can be mounted in only one orientation. The pin on the rotor shaft fits into a notch on the underside of the rotor directly underneath rotor position 1. Line up position 1 of the rotor with the pin on the rotor shaft and carefully lower the rotor onto the shaft. Install the rotor nut on top of the rotor and tighten using the rotor key supplied with the QIAcube. Make sure that the rotor is securely seated. Check that all buckets are properly suspended and can swing freely.

Note: The side of the rotor bucket that must face towards the rotor shaft is marked with a gray line to help prevent buckets from being loaded incorrectly.

Important: All centrifuge buckets must be mounted before starting a protocol run, even if fewer than 12 samples are to be processed.

WARNING	**Risk of personal injury and material damage** [w17] The rotor nut must be securely tightened using the rotor key supplied with QIAcube. If the rotor nut is not tightened properly, it can become loose during operation of the centrifuge.

Installing the shaker adapter

A shaker adapter must be installed before the shaker can be used. Two types of shaker adapter are available:

- Adapter for 2 ml microcentrifuge safe-lock tubes (marked with "2")
- Adapter for 2 ml screw-cap tubes (marked with "S2").

The QIAcube is delivered with the shaker adapter for 2 ml microcentrifuge safe-lock tubes already installed. If you need to install the shaker adapter for 2 ml screw-cap tubes:

1. Remove the shaker rack.
2. Remove the shaker adapter for 2 ml microcentrifuge safe-lock tubes by unscrewing the retaining screws. Use the Allen key supplied with the QIAcube.
3. Place the shaker adapter for 2 ml screw-cap tubes onto the shaker.
4. Tighten the 2 retaining screws using the Allen key.

Note: Make sure to use the correct adapter for the sample tubes as this helps to ensure optimal instrument performance. Using an incorrect shaker adapter can adversely affect pipetting performance and protocol results. For more information about sample tubes and the appropriate shaker adapters, see the corresponding protocol sheet.

4.5 Packing the QIAcube

WARNING	**Risk of personal injury and material damage** [W2] The QIAcube is too heavy to be lifted by one person. To avoid personal injury or damage to the instrument, do not lift the instrument alone.

If you need to transport the QIAcube, the instrument must first be decontaminated (see Section 6.5) and then prepared as follows:

1. Prepare packing material. Materials required are the cardboard carton, the pallet with foam blocks, the foam lid, and the foam protector for the X- and Y-axes.

The centrifuge lid must be open to allow access to the inside of the centrifuge. If the lid is not open, perform the following steps.

1. Close the instrument door.
2. Press “Tools” in the main menu.
3. Highlight “Maintenance” (scroll through the list by pressing “▲” or “▼”), and press “Select”.
4. Highlight “Open lid” (scroll through the list by pressing “▲” or “▼”), and press “Select”.
5. Open the instrument door.
6. Undo the rotor nut on top of the rotor using the rotor key and carefully lift the rotor off the rotor shaft.
7. Close the door.
8. Press “Tools” in the main menu.
9. Select “Maintenance” by pressing “▲” or “▼” to scroll through the list until it is highlighted, and then press “Select”.
10. Select the protocol “Close lid” by pressing “▲” or “▼” to scroll through the list until it is highlighted, and then press “Start”.
11. When the centrifuge lid is closed, switch off the QIAcube and open the door.
12. Insert the foam protector into the front of the instrument.
13. Press the foam down between the centrifuge and the robotic arm.

Foam protector inserted between the centrifuge and the robotic arm.

14. Push the foam until the rear end touches the back wall of the instrument. Ensure that the arm is held firmly in place and cannot move.
15. Make sure that the QIAcube door can be closed properly. The door should lightly brush against the foam.
16. Place the accessories into the drawer. The following accessories should be packed in air cushion bags:
    - Rotor key
    - Rotor nut
    - USB stick
    - Allan key
    - Shaker rack plugs
    - Shaker adapter
17. Place the QIAcube onto the pallet and put the black foam lid over the top of the instrument. Place the box onto the instrument. When lifting the QIAcube, slide your fingers under both sides of the workstation and keep your back straight.
18. Place accessories into the black foam lid. The following accessories should be packed in air cushion bags:
    - Rotor with swing-out buckets
    - Power cords
    - *QIAcube User Manual*

19. Seal the outside edges of the carton with tape to protect against moisture.
    Note: Using the original package minimizes damage during transportation of the QIAcube.

5 Operating Procedures

This section describes how to operate the QIAcube.

Before proceeding, we recommend that you familiarize yourself with the features of the instrument by referring to Section 3.

Important: The QIAcube is designed for use with QIAGEN spin columns only. Geometry of spin columns manufactured by other suppliers may not be compatible with the QIAcube.

CAUTION	**Damage to the instrument** [C2] Only use QIAGEN spin columns and QIAGEN Spin Kits with the QIAcube. Damage caused by use of other types of spin column or chemistries will void your warranty.

The door of the QIAcube must remain closed during operation of the instrument. Only open the door when instructed to do so by the software.

WARNING	**Risk of personal injury and material damage** [W3] Do not attempt to move the QIAcube during operation.

WARNING	**Moving parts** [W11] To avoid contact with moving parts during operation of the QIAcube, the instrument must be operated with the door closed. If the door sensor is not functioning correctly, contact QIAGEN Technical Services.

5.1 QIAcube software

The QIAcube is operated through the touchscreen. The functions of some of the buttons are described below.

▲	Enables the user to scroll up through a list.
▼	Enables the user to scroll down through a list.
Select	Enables the highlighted parameter to be selected.
Back	Returns to the previous step.
Options	Lists the available options for the protocol (e.g., “Remove”).
Cancel	Cancels the previous command or returns to the previous step without saving any changes.
Edit	Enables the user to enter values for certain parameters (e.g., elution volume).
+	Increases the displayed value.
–	Decreases the displayed value.
Default	Enables the default value of the highlighted parameter to be used.
Save	Enables changes to be saved to the protocol.
Start	Starts a protocol run.

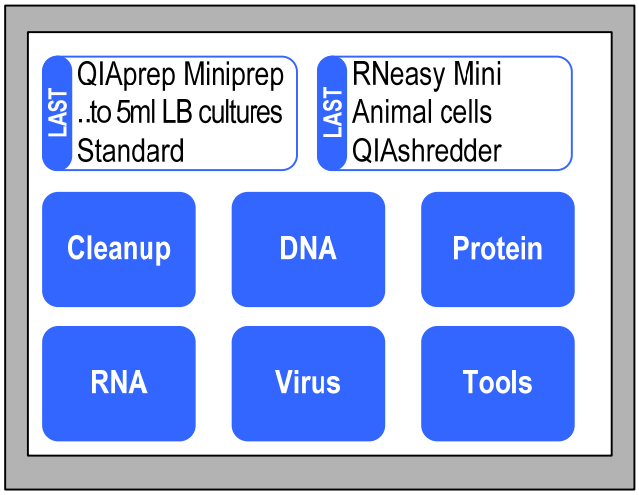
5.2 Running a QIAGEN protocol

The most popular QIAGEN standard protocols are already installed on the QIAcube. All available QIAGEN protocols, including the corresponding protocol sheets, can be downloaded from the QIAcube web portal (www.qiagen.com/MyQIAcube). Refer to the handbook supplied with the QIAGEN kit you are using and the relevant

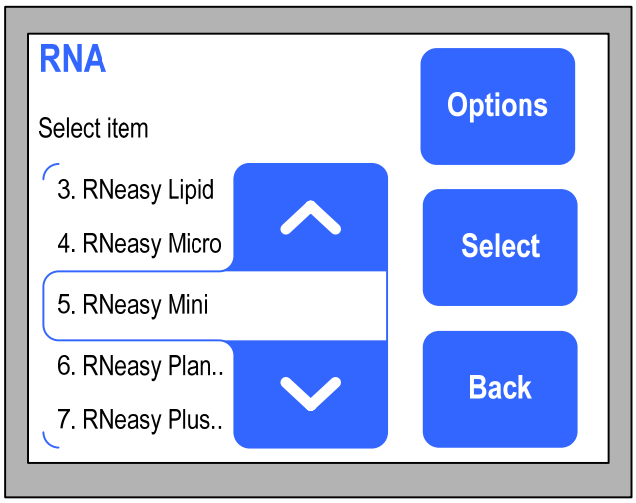
protocol sheet to find out which protocol to load and to obtain further details about the protocol.

5.2.1 Starting a protocol

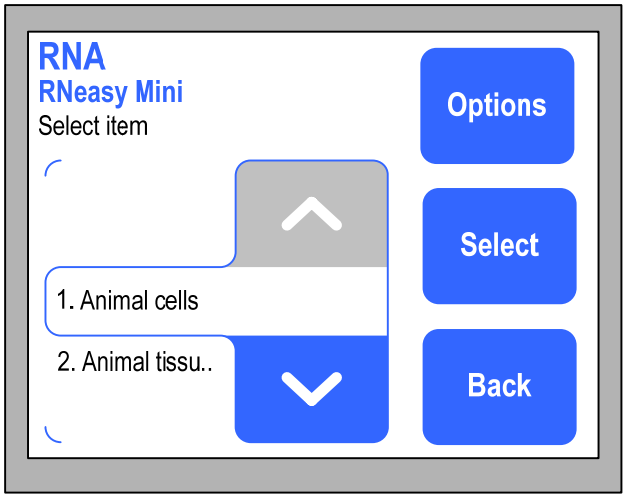
1. Carefully read the handbook supplied with the QIAGEN kit and the relevant protocol sheet (available at www.qiagen.com/MyQIAcube) before starting.
2. Prepare the samples and reagents to be used in the protocol. Refer to the handbook supplied with the kit and to the relevant protocol sheet for instructions.
3. Close the instrument door.
4. Switch on the QIAcube at the power switch.
   - The beeper sounds, and the startup screen appears.
   - The instrument automatically performs initialization tests.
5. Select the appropriate application from the main menu by pressing “Cleanup”, “DNA”, “Protein”, “RNA”, or “Virus”.



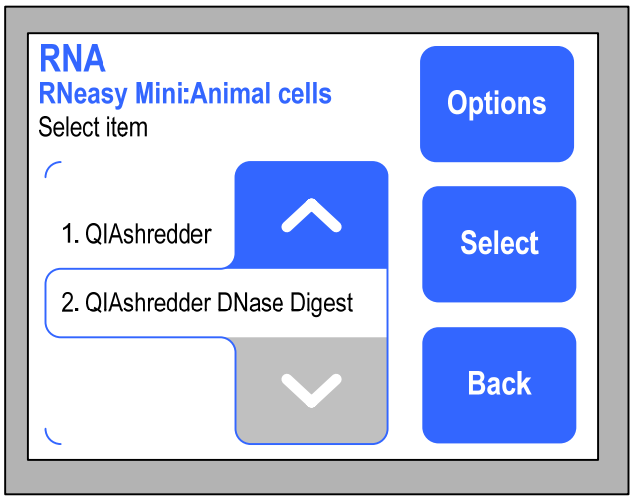
6. Select the correct kit name by pressing “▲” or “▼” to scroll through the list until the correct kit name is highlighted, and then press “Select”.



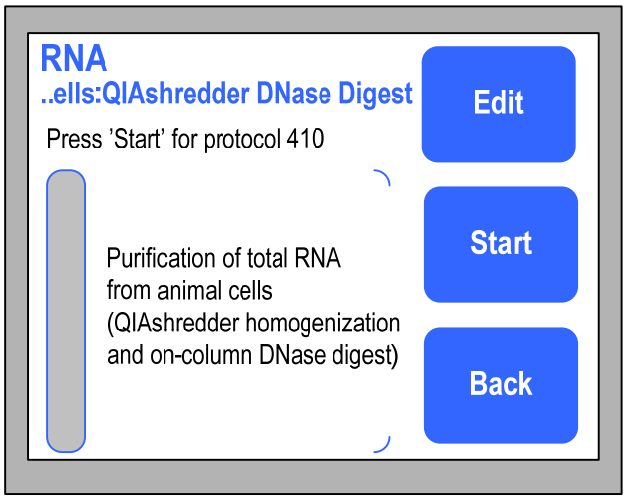
7. Select the sample material (this step may not be required for all protocols) by pressing "▲" or "▼" to scroll through the list until the required sample material is highlighted, and then press "Select".



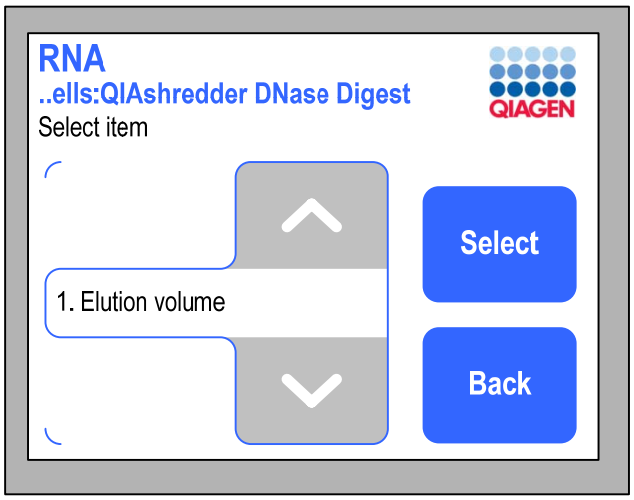
8. Depending on the protocol, further options may be available (e.g., standard protocol, homogenization using a QIAshredder column, on-column DNase digest, etc.). Select the protocol by pressing "▲" or "▼" to scroll through the list until the required protocol is highlighted, then press "Select".



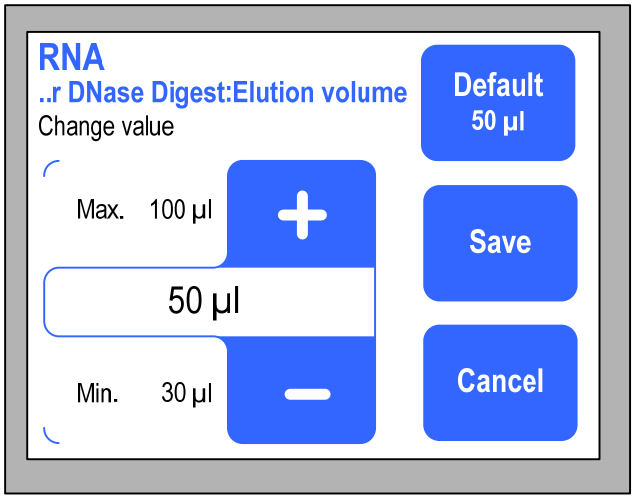
9. To start the protocol run, press “Start” and proceed to step 12. To enter user-defined values for certain parameters such as elution volume, press “Edit”.
Note: Not all protocols allow user-defined values to be entered.

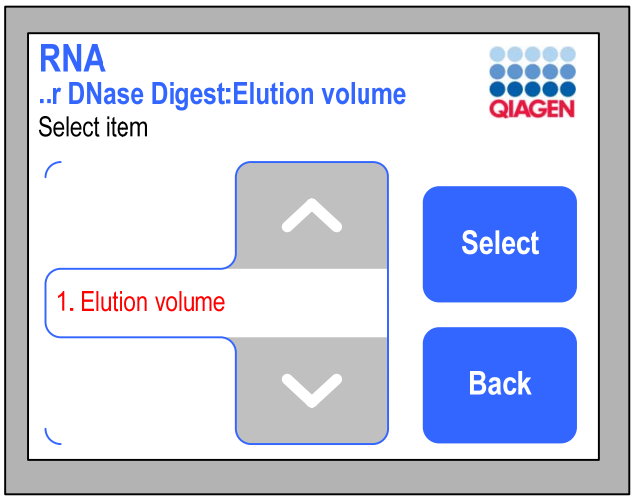


10. Press “▲” or “▼” to highlight the parameter to be edited, for example, “Elution volume”, and then press “Select”.

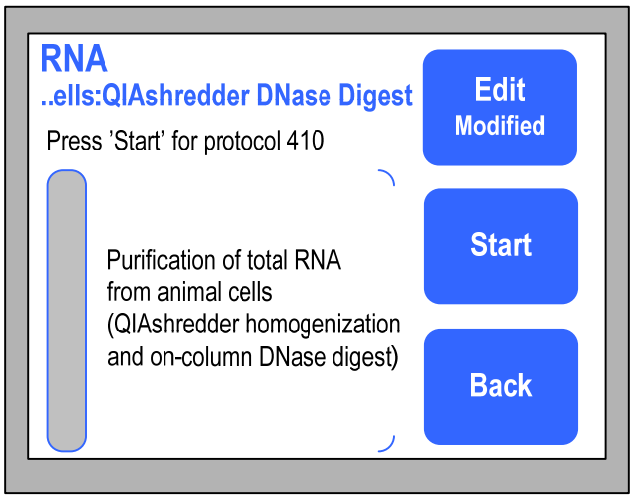


11. Change the elution volume by pressing "+" or "–". The default value is displayed in the "Default" button. Press "Save" to save the changes. The parameter that has been changed will then be displayed in red. Press "Back" to exit edit mode.





12. The “Edit” button now indicates that the protocol has been modified. If run reports should be automatically saved to the USB stick, insert the USB stick into the USB port (see Section 5.5). Press “Start” to start the protocol run.



13. Open the worktable door.
14. Follow the instructions in the protocol sheet and displayed in the touchscreen for loading the worktable with samples, reagents, and labware (see Section 5.3 for more information about worktable setup). You will be instructed to:
    - Empty the waste drawer.
    - Place prefilled tip racks onto the worktable.

- Fill the reagent bottles and place the reagent bottle rack onto the worktable. Be sure to remove the lids from the reagent bottles before placing on the worktable.
- Load opened accessory-buffer tubes required by the protocol in positions A, B, or C.
- Place the loaded rotor adapters into the centrifuge buckets.
- Load the shaker rack with samples, and place onto the shaker. Be sure to use the correct sample tubes and the correct shaker adapter, as described in the protocol sheet (see page 5-16).

15. Close the QIAcube door.
16. After you have set up the worktable, the QIAcube performs a load check, which consists of the following tasks:
    - The instrument is initialized.
    - The shaker is checked to make sure it is correctly loaded.
    - The number of rotor adapters in the centrifuge is checked to make sure that it corresponds to the number of samples in the shaker and that the rotor is correctly loaded.
    - The reagent bottle rack is checked to make sure that it is correctly loaded and there is sufficient buffer in the reagent bottles.
      Note: The volume of accessory buffers in positions A, B, or C on the worktable is not checked. Be sure to fill the microcentrifuge tubes with the exact volume of buffer required.
    - The filter-tips are checked to make sure that the correct type has been loaded and that there are sufficient filter-tips for the protocol run.
17. If the load check is unsuccessful, an error message will be displayed in the touchscreen. Resolve the error so that the protocol run can continue (see Section 7.2.1).
    Note: When resolving a load check error, only move or change the affected samples or consumables.

5.2.2 End of the protocol run

When the protocol run has finished, a message is displayed in the touchscreen confirming that the samples have been processed. Follow the instructions in the touchscreen for worktable cleanup.

1. Remove the microcentrifuge tubes containing purified nucleic acids or proteins from the rotor adapters.
2. Discard sample tubes, used rotor adapters, and reagents according to your local safety regulations.
3. Replace the lids of the reagent bottles and close tightly. Store the bottles according to the instructions in the relevant kit handbook.
4. Empty the waste drawer.
5. Run another protocol, or switch off the QIAcube.

5.2.3 Stopping a protocol

You can stop a QIAGEN protocol if there is an emergency by pressing “Cancel”. To confirm that you want to stop the protocol run, press “OK”. To cancel the stop protocol command, press “Cancel”.

Note: If a protocol run is stopped, the run cannot be restarted; the samples must be processed manually (see Sections 7.2.6 and 7.2.7).

5.3 Setting up the worktable

5.3.1 Loading the reagent bottle rack

Attaching labeling strips to the reagent bottle rack

Two rack labeling strips must be attached to the reagent bottle rack. These strips are kit-specific and identify the positions into which the QIAGEN buffers required for the protocol should be placed. In addition, the strips ensure that the reagent bottle rack is positioned correctly on the worktable for liquid detection during the load check.

Attach each rack labeling strip by sliding it onto the flange at each side of the rack. The labeling strips fit onto the rack only in the correct orientation.

Note: The reagent bottle rack must only be used with the labeling strips attached.

Attaching labeling strips.

Carefully fill each bottle with buffer, and place into the appropriate position in the reagent bottle rack indicated by the rack labeling strip. Pour carefully to ensure that the buffer does not foam or contain large air bubbles. Reagent volumes are checked at during the load check at the start of the protocol run.

Important: Be sure to remove lids from the bottles before placing onto the worktable.

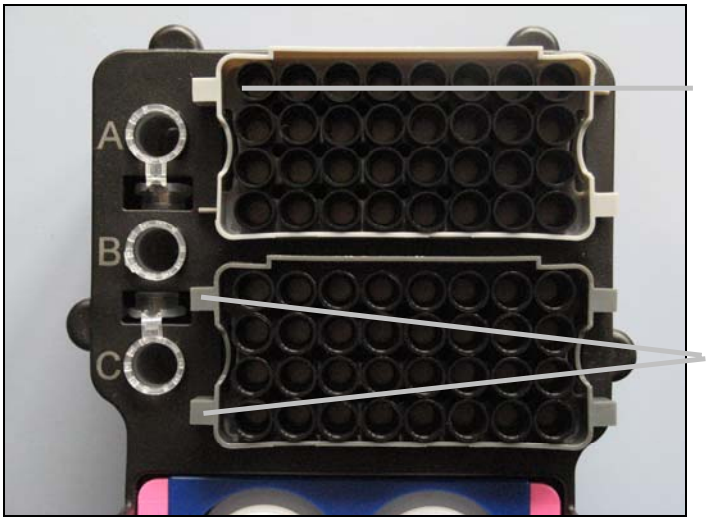
When instructed to do so, place the reagent bottle rack containing buffer bottles onto the worktable. The rack fits onto the worktable only in the correct orientation.

Important: Be sure to place the reagent bottle rack correctly into the designated slot of the worktable. Leaning positioned bottle racks could lead to errors during liquid detection.

Loading the reagent bottle rack.

5.3.2 Loading the tip racks

The QIAcube is provided with 3 tip racks: a rack for 200 µl filter-tips (blue-colored), a rack for 1000 µl filter-tips (light-gray colored), and a rack for 1000 µl wide-bore filter-tips (dark-gray colored). Each tip rack has a specially positioned notch that the optical sensor uses to identify the tip rack during the load check. The rack for 200 µl filter-tips has a notch at the left forward side, the rack for 1000 µl filter-tips has a notch at the left rear side, and the rack for 1000 µl wide-bore filter-tips has 2 notches. During the load check, the QIAcube checks that the correct tip racks have been placed on the worktable and that there are sufficient tips for the protocol run. When refilling tip racks, make sure to load the racks with the correct size of filter-tip. Only use filter-tips designed for use with the QIAcube.


A
B
C
Tip rack for 1000 µl filter-tips has 1 notch at the left rear side
Tip rack for 1000 µl wide-bore filter-tips has 2 notches

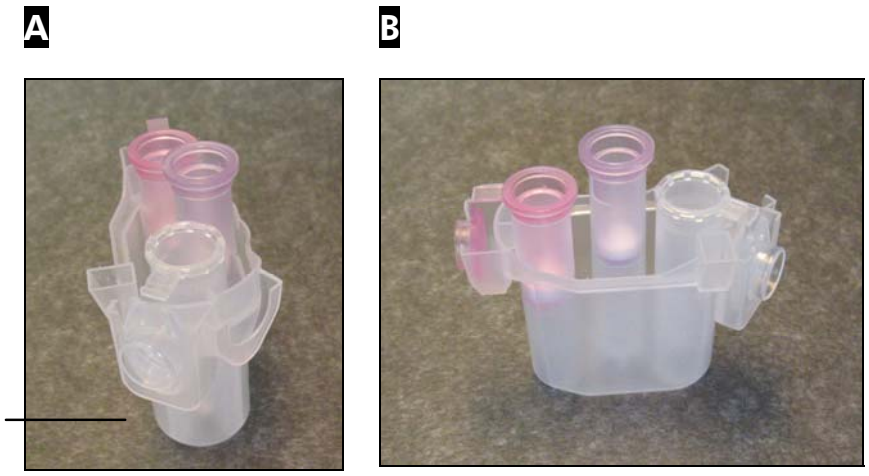
QIAcube tip racks.

Important: Do not use damaged filter-tips. Do not load damaged tip racks onto the worktable.

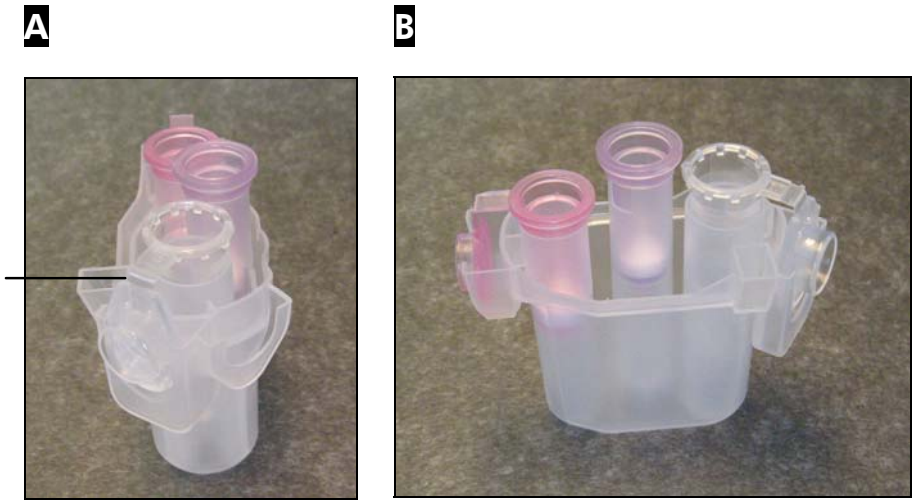
5.3.3 Loading the rotor adapters

Rotor adapters can be placed into the rotor adapter holder enabling convenient and easy loading. Place 1.5 ml microcentrifuge tubes (supplied with the rotor adapters) and QIAGEN spin columns into the appropriate positions in each rotor adapter as described in the corresponding protocol sheet. Ensure the 1.5 ml microcentrifuge tubes and spin columns have been pushed firmly into the appropriate position.

WARNING	**Risk of personal injury and material damage** [W18] Make sure that lids from spin columns and 1.5 ml microcentrifuge tubes are in the correct position and pushed all the way down to the bottom of the slots on the sides of the of the rotor adapter. Incorrectly positioned lids can break off during centrifugation.



Correctly loaded rotor adapter. A Rotor adapter is correctly loaded and the 1.5 ml microcentrifuge tube lid is in the correct position; B Correctly loaded rotor adapter seen from the side.

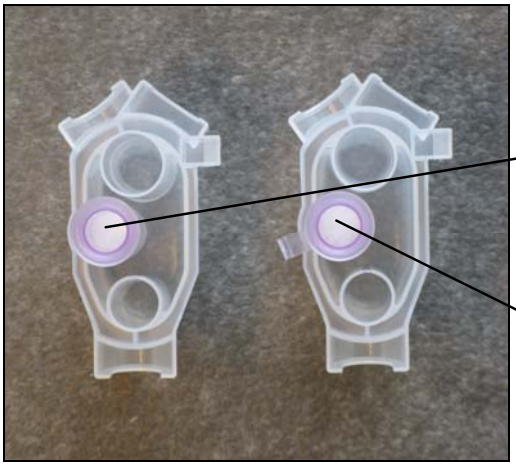


Incorrectly loaded rotor adapter. A Rotor adapter is incorrectly loaded with a 1.5 ml microcentrifuge tube. The lid of the tube is not pushed all the way down to the bottom of the slot of the rotor adapter and could break off during centrifugation, causing the protocol run to crash (compare with part A of the previous figure); B Incorrectly loaded rotor adapter seen from the side (compare with part B of the previous figure).

Rotor adapter is incorrectly loaded with a 1.5 ml microcentrifuge tube. The lid of the tube is positioned in the wrong slot of the rotor adapter. During column transfer the lid of the spin column could crash onto the lid of the 1.5 ml microcentrifuge tube, causing the protocol run to crash.

If the protocol requires the use of a column in the middle position (e.g., QIAshredder spin column), cut off the lid before loading the column.

WARNING	**Risk of personal injury and material damage** [W19] Be sure the lid is completely removed from the spin column. Spin columns with partially removed lids may not be removed properly from the rotor, causing the protocol run to crash.



Loading a column into the middle position.

If the protocol requires use of spin columns with screw caps (e.g., Qproteome Albumin/IgG Depletion Spin Columns), remove the screw-cap from the spin column, and screw a spin column adapter ring (not supplied with the QIAcube; cat. no. 990399) onto the column.

Mounting a spin column adapter ring.

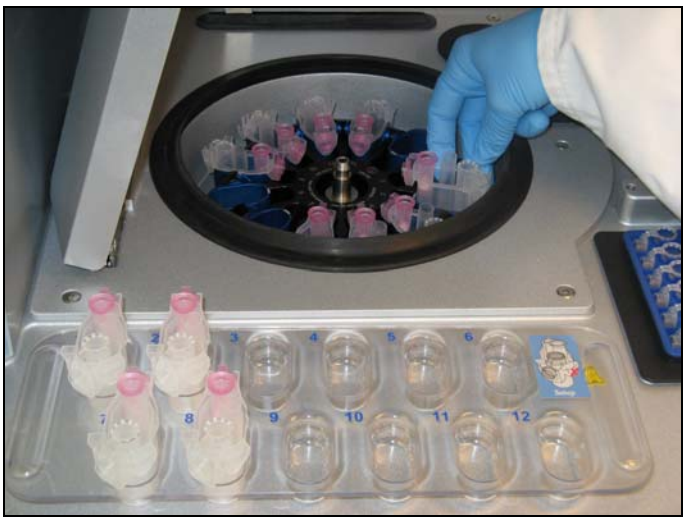
Break off the bottom closure of the spin column, and place the spin column into the appropriate position of the rotor adapter.

The spin column adapter ring enables the robotic gripper to transfer the column during the purification procedure.

Place the loaded rotor adapters into the centrifuge buckets when instructed to do so by the software. For ease of use and high process safety, the rotor adapters only fit into the centrifuge buckets in one orientation.

Note: If processing fewer than 12 samples, make sure to load the centrifuge rotor symmetrically. For more information, see Appendix B or the loading chart available at www.qiagen.com/MyQIAcube . All centrifuge buckets must be mounted before starting a protocol run, even if fewer than 12 samples are to be processed.

WARNING	**Risk of personal injury and material damage** [W16] Do not use damaged rotor adapters. The rotor adapters are for single use only. Do not reuse the rotor adapters as they can be damaged by the high *g* forces experienced in the centrifuge.



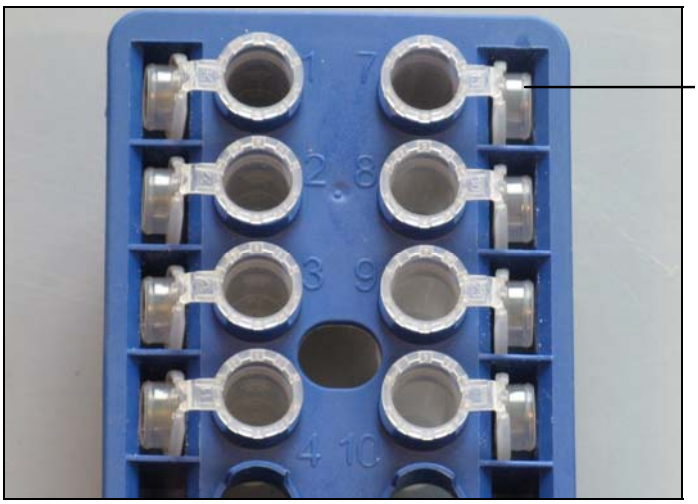
Loading the centrifuge.

5.3.4 Loading the samples

Make sure that the correct shaker adapter is installed (see Section 4, page 4-6). Two types of shaker adapter are available:

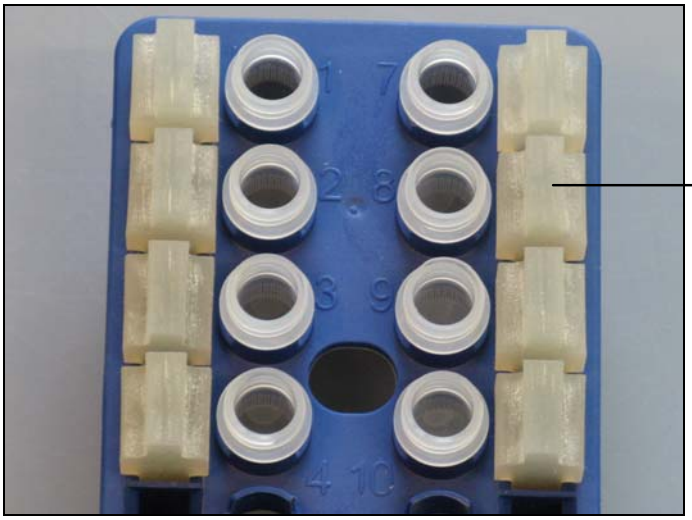
- Adapter for 2 ml safe-lock microcentrifuge tubes (marked with “2”)
- Adapter for 2 ml screw-cap tubes (marked with “S2”)

For more information about the required sample tube types (e.g., Sample Tubes RB (2 ml) cat. 990381, Sample Tubes CB (2 ml) cat 990382), see the relevant protocol sheet. Load opened sample tubes into the shaker rack. The sample positions are numbered for ease of loading. Place the loaded shaker rack onto the shaker when instructed to do so by the software.



Loading the shaker rack with samples tubes that have attached lids.

If using 2 ml safe-lock microcentrifuge tubes, place the lids of the tubes into the slots at the edge of the shaker rack. **Important**: Make sure that the lids are securely seated in the slots.



Shaker rack plugs must be placed into slots at the edge of the shaker rack

Loading the shaker rack with samples tubes that have screw caps.

If using 2 ml screw-cap tubes, place the shaker rack plugs into the slots at the edge of the shaker rack. This enables detection of samples during the load check.

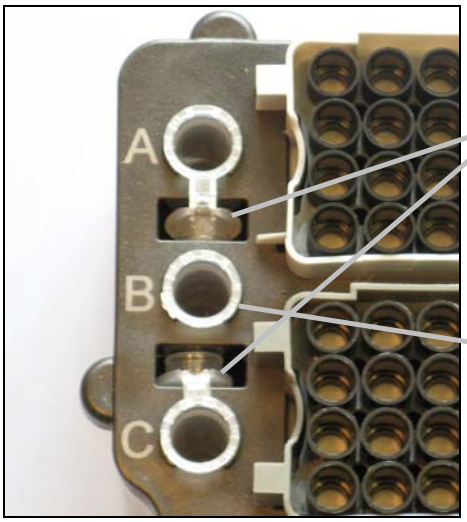
Note: If processing fewer than 12 samples, make sure that the shaker is correctly loaded. For more information, see Appendix B or the loading chart available at www.qiagen.com/MyQIAcube .

WARNING	**Risk of material damage** [W20] Do not use 1.5 ml microcentrifuge tubes on the shaker. Because 1.5 ml microcentrifuge tubes can cause filter-tips to stick during sample transfer, their use on the shaker can damage the pipetting system and can cause a centrifuge crash.

5.3.5 Loading accessory buffers

Up to three 1.5 ml or 2 ml microcentrifuge tubes containing accessory buffers can be placed onto the QIAcube worktable. The exact volume of buffer required for the protocol depends on the number of samples. Buffer volume, tube type, and the position into which the tube should be placed are described in the relevant protocol sheet (available at www.qiagen.com/MyQIAcube).

Important: Because the QIAcube cannot perform a load check on these positions, it is absolutely necessary to use the correct tube type filled with exactly the volume of buffer described in the protocol sheet. Incorrect buffer volumes can lead to pipetting errors during the protocol run. Make sure to open the tubes before placing them onto the worktable. Lids of microcentrifuge tubes should be securely placed into the slots at positions A and C. If 3 tubes are to be placed onto the QIAcube worktable, the lid of 1 tube must be cut off.


A
B
C
Lids of 2 of the microcentrifuge tubes must be securely placed in slots at positions A and C.
The lid of the third tube must be cut off.

Correct loading of accessory buffers.

Incorrect loading of accessory buffers.

5.4 Installing and deleting protocols

At delivery the most common standard QIAGEN protocols are already installed on your QIAcube. The range of protocols available is continually expanding, and additional standard QIAGEN protocols can be downloaded free of charge at www.qiagen.com/MyQIAcube . In addition, our highly qualified Application Specialists can customize QIAGEN protocols or develop new protocols tailored to your needs. Protocols that are no longer required can be easily removed from the QIAcube.

Installing new protocols (standard QIAGEN protocols)

New protocols for the QIAcube can be downloaded at www.qiagen.com/MyQIAcube . To transfer new protocols to the QIAcube, first save them to the USB stick.

1. Create a folder named “New_Protocols” on the USB stick.
2. Go to www.qiagen.com/MyQIAcube and search for the required protocol.
3. Select the protocol to be downloaded and save it to the “New_Protocols” folder on the USB stick.
4. Make sure that the QIAcube is switched on.
5. To install the protocol, connect the USB stick to the QIAcube via the USB port, which is located at the front right of the instrument.
6. In the main menu, press “Tools”.
7. Select “Data Exchange” by pressing “▲” or “▼” to scroll through the list until it is highlighted, and then press “Select”.
8. To transfer protocols to the QIAcube, select “Protocols” and either the “Load individually from USB” or the “Load all from USB” option.
   Load individually from USB: Select the required protocol by pressing “▲” or “▼” to scroll through the list until it is highlighted, and then press “Select”. Start the download procedure by pressing “OK”. A message will confirm that

the protocols have been successfully transferred to the QIAcube.

Load all from USB: Select "Load all protocols" and confirm with "OK". All files of the .qpf format will be transferred from the USB stick to the QIAcube. A message will confirm how many protocols have been successfully transferred to the QIAcube.

Note: Protocols already installed on the QIAcube that have the same name as downloaded protocols will be overwritten.

Note: A maximum of 48 protocols can be transferred to the QIAcube.

When the protocols have been successfully transferred to the QIAcube, press "OK".

Installing new protocols (customized QIAGEN protocols or customer-specific protocols)

Customized QIAGEN protocols or new protocols developed to meet your specific requirements can be purchased from QIAGEN.

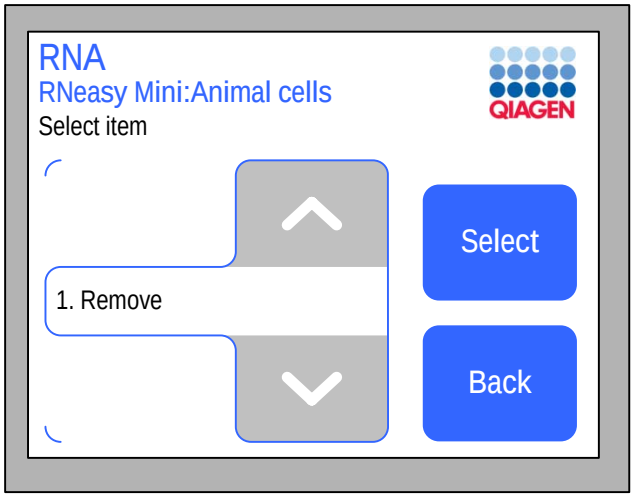
1. Go to www.qiagen.com/MyQIAcube and enter the required information. If our Application Specialists require additional information, they will contact you directly.
2. You will be informed by e-mail when your customized protocol is ready for download.
3. Click the link in the e-mail to go to the download page.
4. To install the protocol on your QIAcube, follow steps 3–8 in "Installing new protocols (standard QIAGEN protocols)", page 5-20.

Deleting protocols

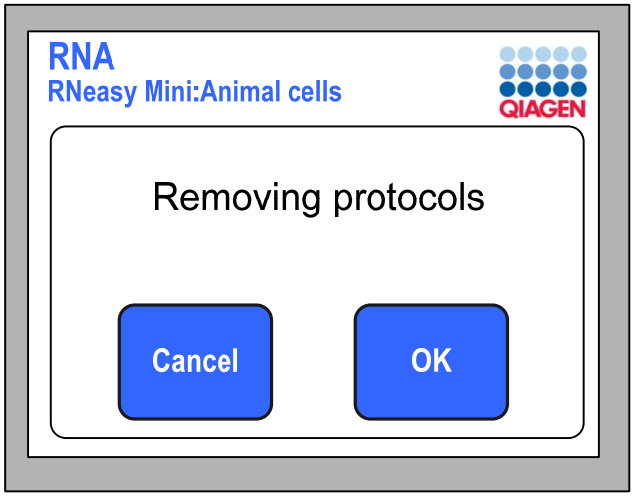
Protocols can individually be removed from the QIAcube by deleting the protocol type or they can be removed in packages by deleting the kit name or starting material.

To remove a single protocol:

1. Select the required application from the main menu.
2. Select the correct kit name by pressing "▲" or "▼" to scroll through the list until the correct kit name is highlighted, then press "Select".
3. Select the starting material (this step may not be required for all protocols) by pressing "▲" or "▼" to scroll through the list until the correct starting material is highlighted, and then press "Select".
4. Select the protocol type by pressing "▲" or "▼" to scroll through the list until the correct protocol is highlighted, and then press "Options".
5. To remove the protocol, select "Remove", and then press "Select".



6. Press "OK" to remove the protocol.



To remove a protocol package:

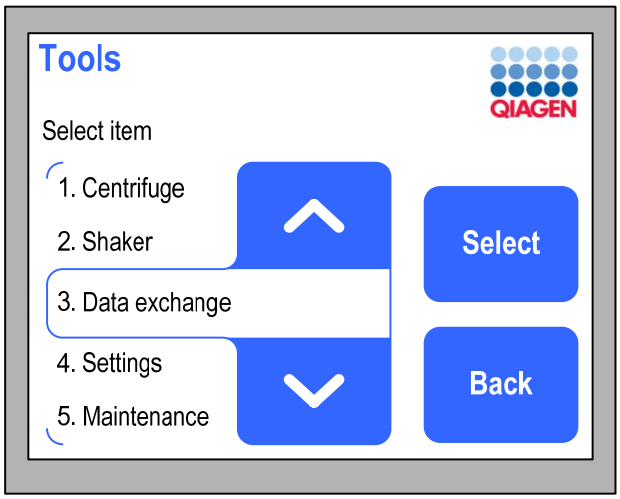
1. Select the required application from the main menu.
2. Select the correct kit name by pressing "▲" or "▼" to scroll through the list until the correct kit name is highlighted, then press "Options".
3. To remove all protocols of the selected kit, select "Remove", and then press "Select".
4. Press "OK" to remove the protocol.

5.5 Saving data files

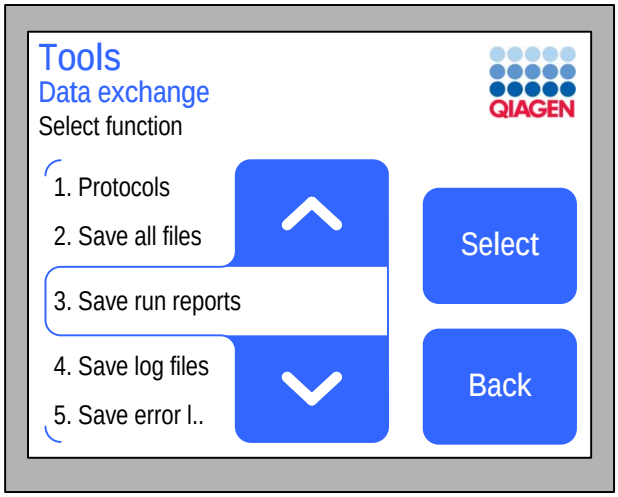
Data files, such as run reports, log files, error logs, or statistics, can be saved to the USB stick.

Note: The QIAcube can store up to 9 log files and run reports. After the tenth protocol run, the oldest log file and run report will be overwritten.

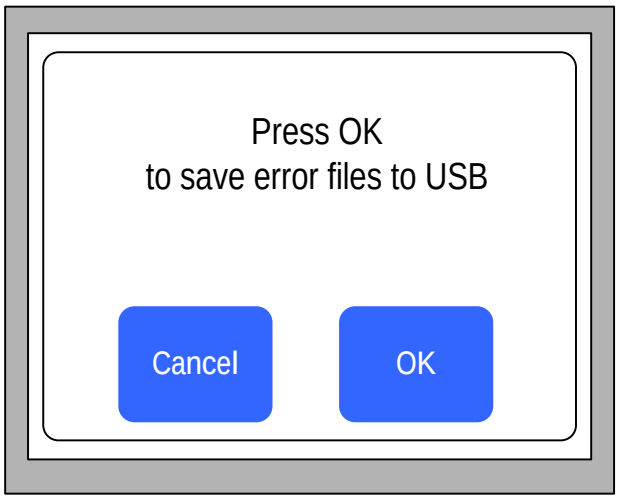
1. Make sure that the QIAcube is switched on.
2. Connect the USB stick to the QIAcube via the USB port, which is located at the front right of the instrument.
3. In the main menu, press "Tools".
4. Select "Data exchange" by pressing "▲" or "▼" to scroll through the list until it is highlighted, and then press "Select".



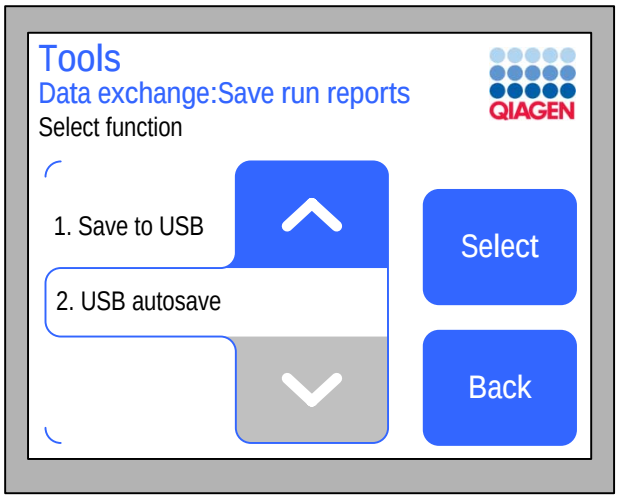
5. Select the appropriate type of data file (e.g., "Save run reports", "Save log files", "Save error logs", "Save statistics", or "Save calibration") by pressing "▲" or "▼" to scroll through the list until the correct data file is highlighted, and then press "Select". To save all files, select "Save all files".



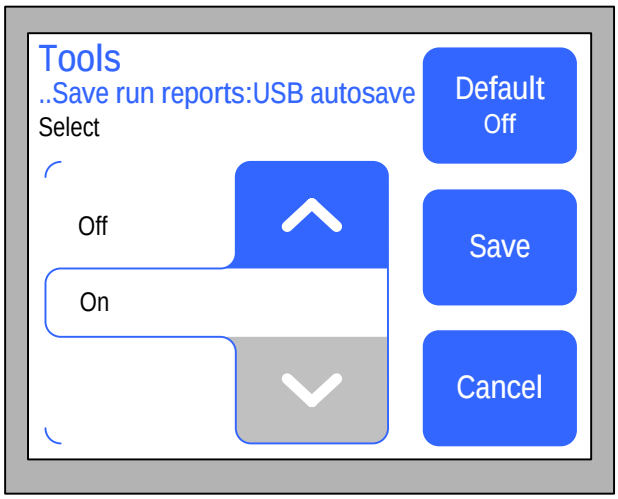
6. Press "OK" to save the data file to the USB stick.



7. A message will appear to confirm that the data file has been successfully saved to the USB stick.
8. When the data file has been successfully saved to the USB stick, press "OK".
9. For run reports only, an additional option is available for automatically saving the run report to the USB stick at the end of each protocol run. Select "USB autosave" by pressing "▲" or "▼" to scroll through the list until it is highlighted, and then press "Select".



10. Select "Off" or "On" by pressing "▲" or "▼" to scroll through the list until the appropriate option is highlighted. The default value is displayed in the "Default" button. Press "Save" to save the changes.

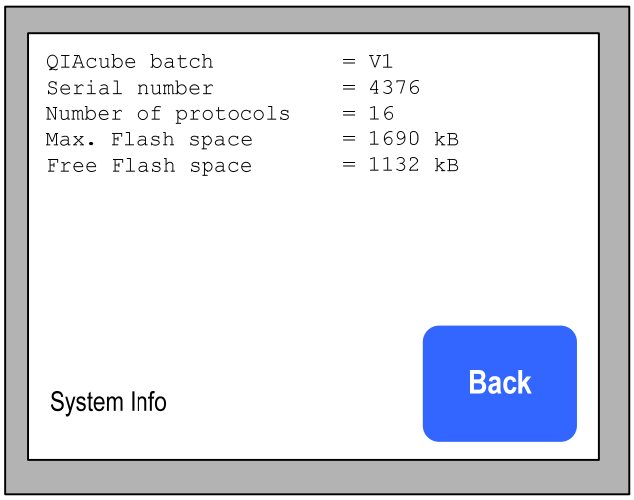


5.6 General information

System information

System information, such as the instrument serial number, the number of installed protocols, as well as the system's memory capacity (maximum and currently available), can be easily displayed.

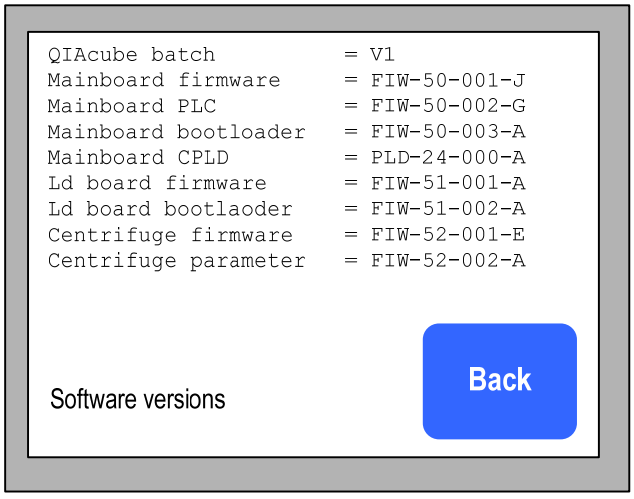
1. In the main menu, press “Tools”.
2. Select “Service” by pressing “▲” or “▼” to scroll through the list until it is highlighted, and then press “Select”.
3. Select “System info” by pressing “▲” or “▼” to scroll through the list until it is highlighted, and then press “Select”.


QIAcube batch = V1
Serial number = 4376
Number of protocols = 16
Max. Flash space = 1690 kB
Free Flash space = 1132 kB
System Info
Back

Identification of software versions

The software versions that are installed on your QIAcube can be easily identified.

1. In the main menu, press “Tools”.
2. Select “Service” by pressing “▲” or “▼” to scroll through the list until it is highlighted, and then press “Select”.
3. Select “Software versions” by pressing “▲” or “▼” to scroll through the list until it is highlighted, and then press “Select”.



4. Compare the installed software versions with the newest available on the QIAcube Web Portal (available at www.qiagen.com/MyQIAcube). We recommend always

installing the latest software version to ensure the best performance of your instrument. The software versions can be distinguished by the alphabetic index at the end of the identifier of the software versions.

Software update

For detailed information on how to upgrade the software versions of your QIAcube refer to the software update documentation on the QIAcube Web Portal (available at www.qiagen.com/MyQIAcube).

Display brightness

The brightness of the QIAcube touchscreen can be adjusted.

1. In the main menu, press “Tools”.
2. Select “Settings” by pressing “▲” or “▼” to scroll through the list until it is highlighted, and then press “Select”.
3. Select “Brightness” by pressing “▲” or “▼” to scroll through the list until it is highlighted, and then press “Select”.
4. The brightness of the touchscreen can be adjusted by pressing “+” or “–”.
5. To save the change, press “Save”. To exit without saving the change, press “Cancel”.

Beeper volume

1. In the main menu, press “Tools”.
2. Select “Settings” by pressing “▲” or “▼” to scroll through the list until it is highlighted, and then press “Select”.
3. Select “Beeper volume” by pressing “▲” or “▼” to scroll through the list until it is highlighted, and then press “Select”.
4. The volume of the beeper can be adjusted by pressing “+” or “–”.
5. To save the change, press “Save”. To exit without saving the change, press “Cancel”.

Maintenance

To reinitialize the QIAcube, to open or close the centrifuge lid, to perform a tightness test, or to gain access to the robotic arm for cleaning, follow the instructions below.

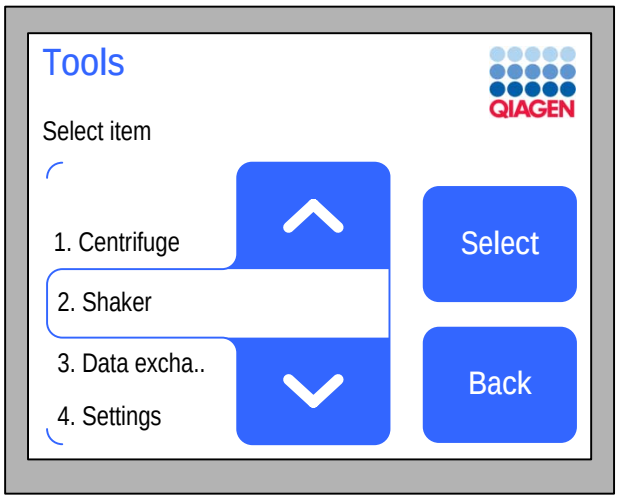
1. In the main menu, press “Tools”.
2. Select “Maintenance” by pressing “▲” or “▼” to scroll through the list until it is highlighted, and then press “Select”.
3. Select “Initialize”, “Open lid”, “Close lid”, “Cleaning position”, or “Tightness test”.

5.7 Operating the shaker

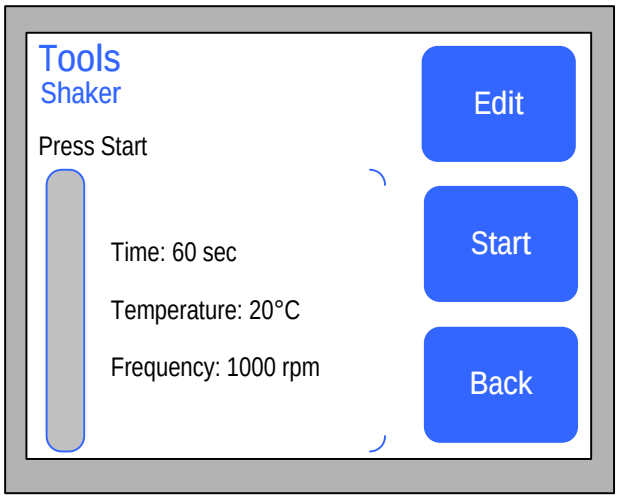
The shaker can be operated individually if the QIAcube is not performing a protocol run. The shaker can be used to heat and shake samples simultaneously, shake samples without heating, or heat samples without shaking.

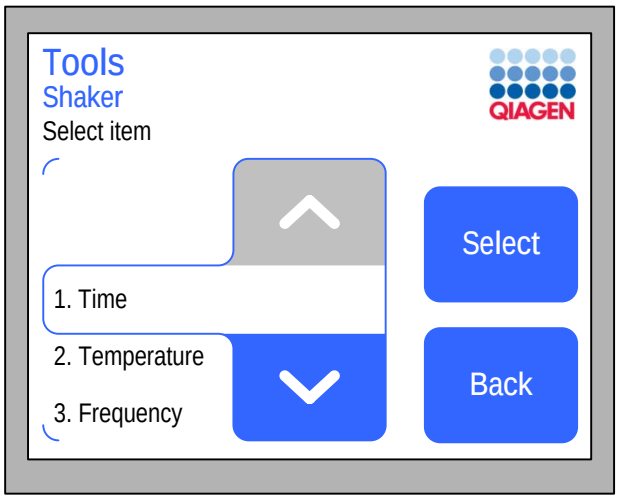
WARNING	**Risk of personal injury and material damage** [W3] Do not attempt to move the QIAcube during operation.

1. Switch on the QIAcube at the power switch.
   - The beeper sounds and the startup screen appears.
   - The instrument automatically performs initialization tests.
2. Open the QIAcube door.
3. In the main menu, press “Tools”.
4. Select “Shaker” by pressing “▲” or “▼” to scroll through the list until it is highlighted, and then press “Select”.

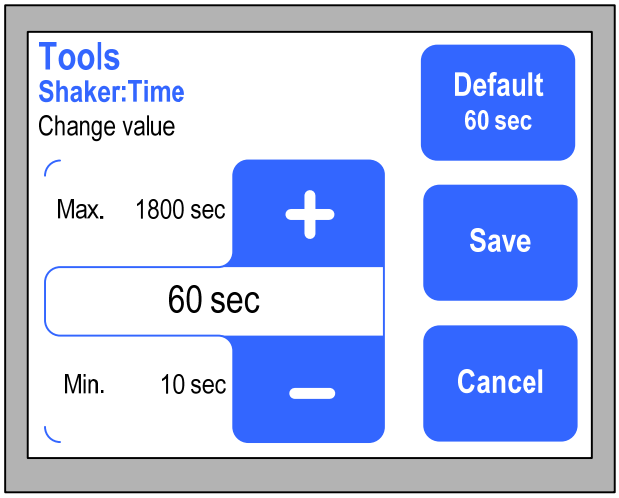


5. To select the time, speed, and temperature, press “Edit” and the appropriate parameter.



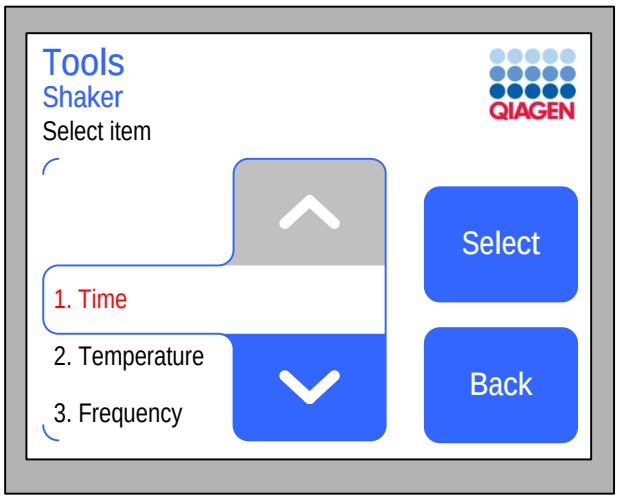


6. The values for each parameter can be changed by pressing "+" or "–", and can be set within the ranges given below. The default value is displayed in the "Default" button. Press "Save" to save the changes.
   - Time: 10–1800 seconds, in increments of 10 seconds
   - Temperature: ambient temperature to 70°C, in increments of 1°C
   - Frequency: 0–2000 rpm, in increments of 100 rpm



   If you have changed a parameter, it will be highlighted in red color.

7. Press "Back" to exit edit mode.



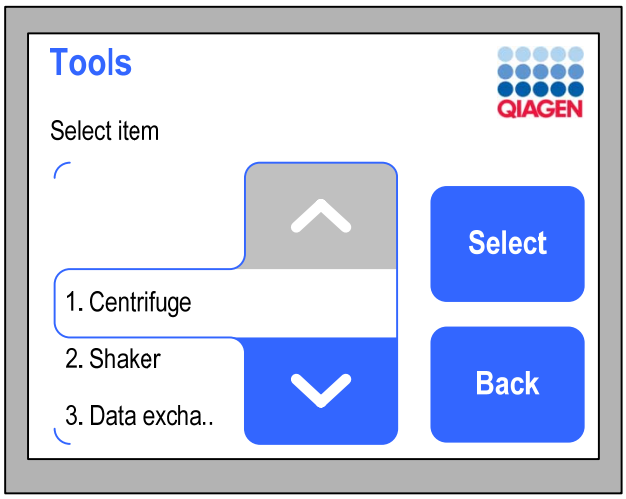
8. Load the shaker rack with samples and close the QIAcube door.
9. Press “Start” to start the shaker.

5.8 Operating the centrifuge

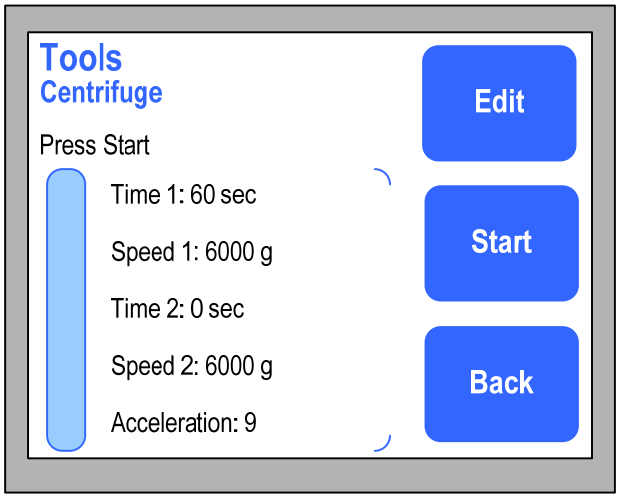
The centrifuge can be operated individually if the QIAcube is not performing a protocol run.

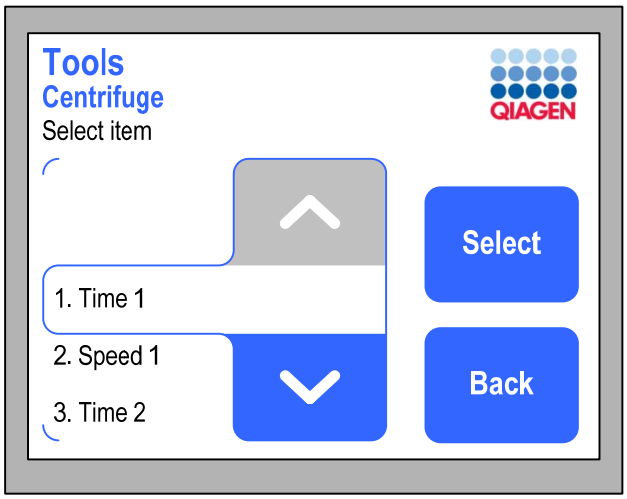
WARNING	**Risk of personal injury and material damage** [W3] Do not attempt to move the QIAcube during operation.

1. Switch on the QIAcube at the power switch.
   - The beeper sounds, and the startup screen appears.
   - The instrument automatically performs initialization tests.
2. Open the QIAcube door.
3. In the main menu, press “Tools”.
4. Select “Centrifuge” by pressing “▲” or “▼” to scroll through the list until it is highlighted, and then press “Select”.

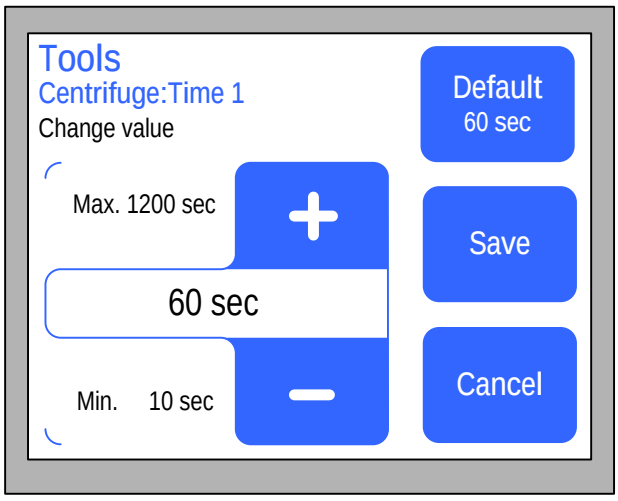


5. To select the speed, time, and acceleration, press “Edit” and the appropriate parameter.





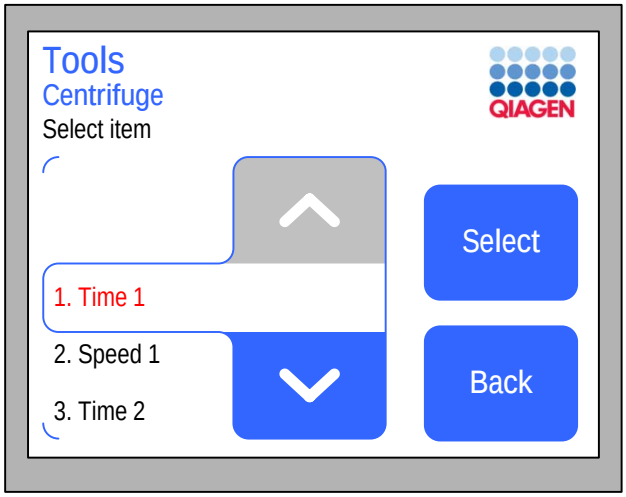
6. The values for each parameter can be changed by pressing "+" or "–", and can be set within the ranges given below. The default value is displayed in the "Default" button. Press "Save" to save the changes.
   - Time 1: 10–1200 seconds, in increments of 10 seconds
   - Speed 1: 1000–12,000 x g, in increments of 100 x g
   - Time 2: 0–1200 seconds, in increments of 10 seconds
   - Speed 2: 1000–12,000 x g, in increments of 100 x g
   - Acceleration: 1–9



To run the centrifuge for a specified length of time at one speed, enter values for "Time 1" and "Speed 1" and enter *0* for "Time 2".

If required, the centrifuge can be set to run for a specified time at a given speed ("Time 1" and "Speed 1") and then can run at an increased or decreased speed for a specified time ("Time 2" and "Speed 2").
The acceleration rate of the centrifuge can be set by entering a value for "Acceleration". A value of *1* gives the slowest rate of acceleration; a value of *9* gives the maximum rate of acceleration.

7. If you have changed a parameter, it will be highlighted in red color. Press "Back" to exit the edit mode.



8. If required, load opened 1.5 ml microcentrifuge tubes and/or QIAGEN spin columns into the rotor adapters and place the lids into the appropriate slots in the rotor adapter. Place the rotor adapters into the centrifuge, and close the QIAcube door. For more information about loading the rotor adapters, see Section 5.3.3.
Note: If processing fewer than 12 samples, make sure to load the centrifuge rotor symmetrically. For more information, see Appendix B or the loading chart available at www.qiagen.com/MyQIAcube . All centrifuge buckets must be mounted, even if fewer than 12 samples are to be processed.

WARNING	**Risk of personal injury and material damage** [W16] Do not use damaged rotor adapters. The rotor adapters are for single use only. Do not reuse the rotor adapters as they can be damaged by the high *g* forces experienced in the centrifuge.

9. Press “Start” to start the centrifuge.

6 Maintenance Procedures

The following maintenance procedures must be carried out to ensure reliable operation of the QIAcube:

- **Regular maintenance** — after each protocol run
- **Daily maintenance** — after the last protocol run of the day
- **Monthly maintenance** — every month
- **Periodic maintenance** — when necessary; at least every 6 months

Following these procedures ensures that the QIAcube is free of dust and liquid spills.

The cleaning agent is chosen according to the goal of the cleaning procedure, the sample material, and the downstream assay.

Cleaning agents

The following disinfectants and detergents are recommended for cleaning the QIAcube.

Note: If you want to use disinfectants different from those recommended, ensure that their compositions are similar to those described below.

General cleaning of the QIAcube:

- Mild Detergents
- 70% ethanol

Disinfection

- Ethanol-based disinfectants can be used for disinfection of surfaces, such as the worktable or inside the centrifuge: e.g., 25 g ethanol and 35 g 1-propanol per 100 g liquid or Mikrozid® Liquid (Schülke & Mayr GmbH, cat. no. 109160).
- Disinfectants based on glyoxal and quaternary ammonium salt can be used for submerging worktable items, the centrifuge rotor, and the waste drawer: e.g., 10 g glyoxal, 12 g lauryldimethylbenzylammonium chloride, 12 g myristyldimethylbenzylammonium chloride, and 5–15% nonionic detergent per 100 g liquid, Lysetol® AF (Gigasept® Instru AF in Europe, cat. no. 107410, or DECON-QUAT® 100, Veltek Associates, Inc., in the USA, cat. no. DQ100-06-167-01)

Removal of RNase contamination

- RNase*Zap*® RNase Decontamination Solution (Ambion, Inc., cat. no AM9780) can be used for cleaning surfaces and submerging worktable items, centrifuge rotor, and waste drawer.

Removal of nucleic acid contamination

- DNA-ExitusPlus™ (AppliChem, cat. no. A7089,0100) can be used for cleaning surfaces and submerge worktable items, centrifuge rotor, and waste drawer.

General instructions

- Do not use spray bottles to spray cleaning or disinfectant liquids onto surfaces of the QIAcube workstation. Spray bottles should be used only for items that have been removed from the workstation.
- If solvents or saline, acidic, or alkaline solutions are spilt on the QIAcube or if QIAGEN buffers splash the instrument door, wipe the spilt liquid away immediately.
- Follow manufacturer's safety instruction for handling cleaning agents.
- Follow manufacturer's instruction for soaking time and concentration of the cleaning agents. Immersing for longer than the recommended soak time can harm the instrument.

- Do not use alcohol or alcohol-based disinfectants to clean the QIAcube door. Exposing the QIAcube door to alcohol or alcohol-based disinfectants will cause surface cracking. Clean the QIAcube door with distilled water only.
- Do not submerge buffer bottles in 70% alcohol. The blue ring is not ethanol resistant.
- Take care that no liquid runs down the touchscreen. Liquid may be drawn through the dust protection sealing by capillary forces and cause malfunction of the display. To clean the touchscreen, moisten a soft lint-free cloth with water, ethanol, or a mild detergent and carefully wipe the display. Wipe dry with a paper towel.

CAUTION	**Damage to the instrument** [C5] Do not use bleach, solvents, or reagents containing acids, alkalis, or abrasives to clean the QIAcube.

WARNING	**Risk of electric shock** [W21] Do not open any panels on the QIAcube. **Risk of personal injury and material damage** Only perform maintenance that is specifically described in this user manual.

WARNING	**Hazardous chemicals and infectious agents** [W22] The waste contains samples and reagents. This waste may contain toxic or infectious material and must be disposed of properly. Refer to your local safety regulations for proper disposal procedures.

WARNING	**Risk of personal injury and material damage** [W1] Improper use of the QIAcube may cause personal injuries or damage to the instrument. The QIAcube must only be operated by qualified personnel who have been appropriately trained. Servicing of the QIAcube must only be performed by QIAGEN Field Service Specialists.

WARNING	**Risk of fire** [W9] When cleaning the QIAcube with alcohol-based disinfectant, leave the QIAcube door open to allow flammable vapors to disperse. Only clean the QIAcube when worktable components have cooled down.

Servicing

Contact your local QIAGEN Field Service Specialist or your local distributor for more information about flexible Service Support Agreements from QIAGEN.

6.1 Regular maintenance procedure

After running a protocol, perform the regular maintenance procedure:

1. Empty the waste drawer.
2. Remove used disposable labware and unwanted samples and reagents from the worktable. Discard them according to your local safety regulations.
3. Replace the lids of the reagent bottles and close tightly. Store the bottles according to the instructions in the relevant kit handbook.
   You can now run another protocol or switch off the QIAcube.

6.2 Daily maintenance procedure

After running the last protocol of the day, perform the daily maintenance procedure:

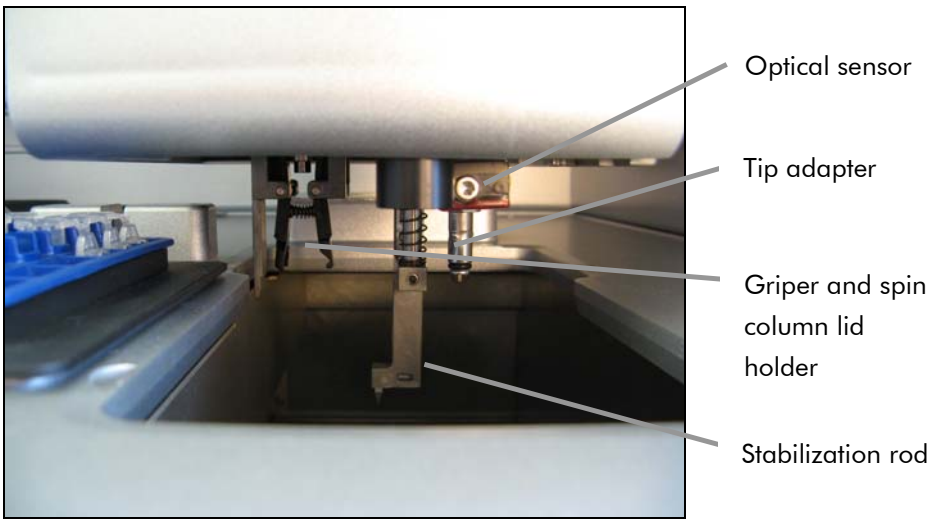
1. Remove used disposable labware and unwanted samples and reagents from the worktable. Discard them according to your local safety regulations.
2. Close the buffer bottles tightly and store according to the instructions in the relevant kit handbook.
3. Empty the waste drawer and check that the liner is clean. If necessary, clean it with cleaning agent, and then rinse with distilled water.

6.3 Monthly maintenance procedure

Perform the regular maintenance procedure before you perform the monthly maintenance procedure. Select the appropriate cleaning agent according to the sample material and downstream assay (see Section 6).

1. Clean the optical sensor, tip adapter, gripper unit, including the gripper, the stabilizing rod, and the spin column lid holder, by carefully wiping these modules with a soft lint-free cloth moistened with water. To gain access to the modules within the robotic arm:
   - Press “Tools” in the main menu.
   - Select “Maintenance” by pressing “▲” or “▼” to scroll through the list until it is highlighted, and then press “Select”.
   - Select “Cleaning position” by pressing “▲” or “▼” to scroll through the list until it is highlighted, and then press “Start”.
   - Follow the instructions displayed in the touchscreen. You will be instructed to remove the waste drawer and the labware tray.

   The robotic arm will move forward and downwards, enabling the modules to be accessed for cleaning through the opening for the waste drawer.



Cleaning modules.

2. After cleaning the modules of the robotic arm, switch off the QIAcube at the power switch.
3. Thoroughly wipe the worktable with a soft lint-free cloth moistened with cleaning agent. Incubate as appropriate, rinse with distilled water, and wipe dry with paper towels.
4. Clean the shaker rack, labware tray, heating adapter, and reagent bottle rack with cleaning agent. Incubate as appropriate, rinse thoroughly with distilled water, and wipe dry with paper towels.
5. Clean the liner of the waste drawer with cleaning agent. Incubate as appropriate, rinse with distilled water, and wipe dry with paper towels.
6. Thoroughly wipe the inside and outside of the QIAcube using the cleaning agents.

   Important: Do not use alcohol or alcohol-based disinfectants to decontaminate the QIAcube door.

   Important: Take care that no liquid runs down the touchscreen. Liquid may be drawn through the dust protection sealing by capillary forces and cause malfunction of the display. To clean the touchscreen, moisten a soft lint-free cloth with 70% ethanol or a mild disinfectant and carefully wipe the display. Wipe dry with a paper towel.

6.4 Periodic maintenance procedure

Select the appropriate cleaning agent according to the sample material and downstream assay (see Section 6).

6.4.1 Cleaning the centrifuge

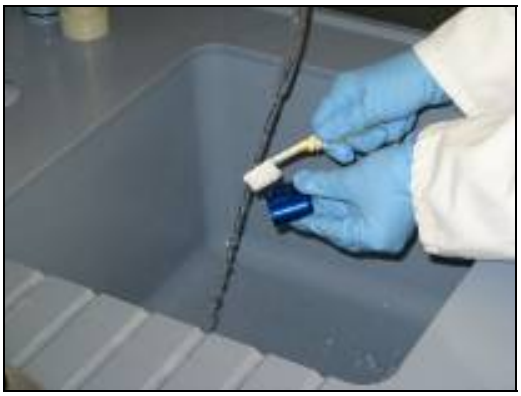
The centrifuge lid must be open to allow access to the inside of the centrifuge. The lid should be opened only after the centrifuge has come to a complete stop. If the lid does not open automatically, perform the following steps.

1. Press “Tools” in the main menu.
2. Highlight “Maintenance” (scroll through the list by pressing “▲” or “▼”), and press “Select”.

3. Highlight “Open lid” (scroll through the list by pressing “▲” or “▼”), and press “Select”.

Cleaning the rotor and buckets

1. Switch off the QIAcube at the power switch.
2. Remove used disposable labware, sample tubes, and reagents from the worktable. Discard according to your local safety regulations.
3. Close the buffer bottles tightly, and store according to the instructions in the relevant kit handbook.
4. Remove all disposable rotor adapters, including tubes and spin columns, from the buckets.
5. Remove the buckets from the rotor. Undo the rotor nut on top of the rotor using the rotor key, and carefully lift the rotor off the rotor shaft.
6. Submerge the rotor, buckets, and rotor nut in cleaning agent. Incubate as appropriate.
7. Rinse thoroughly with distilled water. Use a brush (i.e., a toothbrush or tube brush) to clean any parts that are difficult to access, such as the bucket mount and the rotor head. Wipe surfaces dry with a soft lint-free cloth. If available, dry the buckets and rotor with pressurized air.



Brushing a bucket.

Brushing the rotor.

Important: Make sure the paper towels and brush used are lint-free.

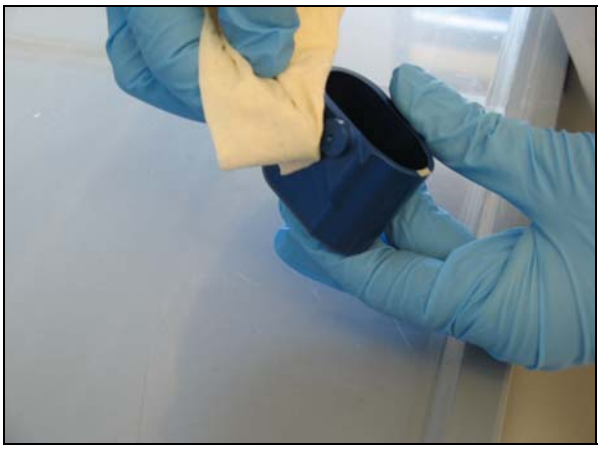
Important: Make sure that all residual salt is removed.

Important: Make sure to remove all traces of cleaning agent from the centrifuge buckets. Residual agent can cause the buckets to jam.

8. Apply a few drops of mineral oil (Anti-Corrosion Oil (rotor), cat. no. 9018543) on a soft, lint-free cloth, and wipe the bucket mount and rotor claw. A thin, invisible oil film should cover the bucket mount and rotor claw, but no droplets or smear should be apparent.
9. Apply oil to the rotor claw and to the bucket mount.

   Important: Before applying oil to the rotor buckets on the rotor, make sure that the rotor and all buckets are completely dry.

Rotor head.



Bucket mounts.

Cleaning the centrifuge

1. Moisten a soft lint-free cloth with cleaning agent, and clean the inside of the centrifuge and the centrifuge gasket. Incubate as appropriate.
2. Clean the inside of the centrifuge and the gasket with distilled water, and wipe dry with lint-free paper towels. If available, use a vacuum cleaner.
   Important: Make sure the gaskets remain in the proper positions.
3. Clean the centrifuge lid with a soft lint-free cloth moistened with cleaning agent. Incubate as appropriate, clean with water, and wipe dry with paper towels.
4. Check the centrifuge gasket for damage. If the gasket is damaged or shows signs of wear, contact QIAGEN Technical Services.

Installing the centrifuge rotor and buckets

1. Mount the rotor.
   The rotor can be mounted in only one orientation. The pin on the rotor shaft fits into a notch on the underside of the rotor directly underneath rotor position 1. Line up position 1 of the rotor with the pin on the rotor shaft and carefully lower the rotor onto the shaft. Install the rotor nut on top of the rotor and tighten using the rotor key

supplied with the QIAcube. Make sure that the rotor is securely seated.

WARNING	**Risk of personal injury and material damage** [W17] The rotor nut must be securely tightened using the rotor key supplied with QIAcube. If the rotor nut is not tightened properly, it can become loose during operation of the centrifuge.

2. Replace the rotor buckets.
   When replacing the rotor buckets, the side of the rotor bucket that must face toward the rotor shaft is marked with a gray line. Hold the bucket at an angle with the gray line facing the center of the rotor and hang the bucket on the rotor. Check that all buckets are properly suspended and can swing freely.
   Important: All centrifuge buckets must be mounted before starting a run.

6.4.2 Cleaning the instrument

To clean the instrument, perform the monthly maintenance procedure (Section 6.3).

6.4.3 Tightness test

The tightness test is performed to check whether the tightness of the pipetting system, including the attached pipetting tip, is sufficient.

1. Load an empty 2 ml safe- lock microcentrifuge tube in position 1 of the shaker.
2. Fill a reagent bottle with 96% ethanol and place in position 1 of the reagent bottle rack.
3. Load a tip rack of the filter tips you want to test (1000 µl or 1000 µl wide-bore) onto the QIAcube.
4. Make sure that the QIAcube is switched on.
5. In the main menu, press “Tools”.

6. Select “Maintenance” by pressing “▲” or “▼” to scroll through the list until it is highlighted, and then press “Select”.
7. Select “Tightness test” by pressing “▲” or “▼” to scroll through the list until it is highlighted, and then press “Select”.
8. Select the appropriate type of filter-tips (“1000 µl tips” or “1000 µl wide-bore tips”) by pressing “▲” or “▼” to scroll through the list until it is highlighted, and then press “Select”.
9. Press “Start” to start the tightness test with the selected type of filter-tips.
10. Follow the instructions displayed in the touchscreen, and press “Start” to start the tightness test.

    After the load check, the robotic arm will pick up a tip, aspirate ethanol, and move to the tube. The tip will remain in place above the tube for 2 minutes. The tip will be detached.
11. After the protocol is completed, open the QIAcube door and check if the tube contains liquid. If the tube is still empty and dry, the tightness of the pipetting system is adequate. If you find liquid in the tube, contact QIAGEN Technical Services.

6.5 Decontaminating the QIAcube

If the QIAcube is contaminated with infectious material, it should be decontaminated. The QIAcube should also be decontaminated before shipping. In this case, a decontamination certificate must be completed to confirm that the decontamination procedure has been carried out.

To decontaminate the QIAcube, follow the periodic maintenance procedure in Section 6.4, using the recommended disinfection agents.

6.6 Cleaning the QIAcube centrifuge after a plastic crash

WARNING	Risk of personal injury [W23] After a plastic crash, sharp plastic particles could be inside the centrifuge. Be careful when handling items inside the centrifuge.

Select the appropriate cleaning agent according to the sample material and downstream assay (see Section 6).

6.6.1 Opening the centrifuge lid

The centrifuge lid must be open to allow access to the inside of the centrifuge. The lid should be opened only after the centrifuge has come to a complete stop. If the lid does not open automatically, perform the following steps.

1. Press “Tools” in the main menu.
2. Highlight “Maintenance” (scroll through the list by pressing “▲” or “▼”), and press “Select”.
3. Highlight “Open lid” (scroll through the list by pressing “▲” or “▼”), and press “Select”.

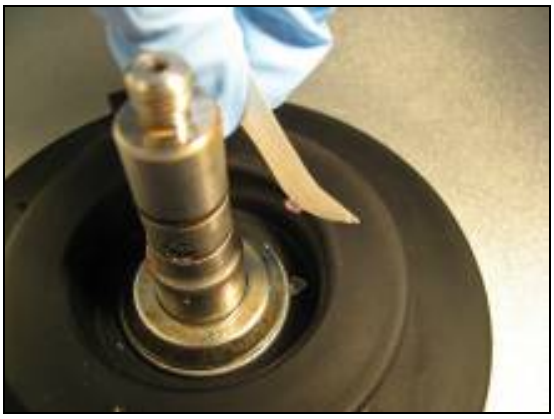
6.6.2 Cleaning the rotor and buckets

1. Switch off the QIAcube at the power switch.
2. Remove used disposable labware, sample tubes, and reagents from the worktable. Discard according to your local safety regulations.
3. Close the buffer bottles tightly, and store according to the instructions in the relevant kit handbook.
4. Remove all disposable rotor adapters, including tubes and spin columns, from the buckets.
5. Remove the buckets from the rotor. Undo the rotor nut on top of the rotor using the rotor key, and carefully lift the rotor off the rotor shaft.
6. Submerge the rotor, buckets, rotor nut, and rotor key with a cleaning agent. Incubate as appropriate.

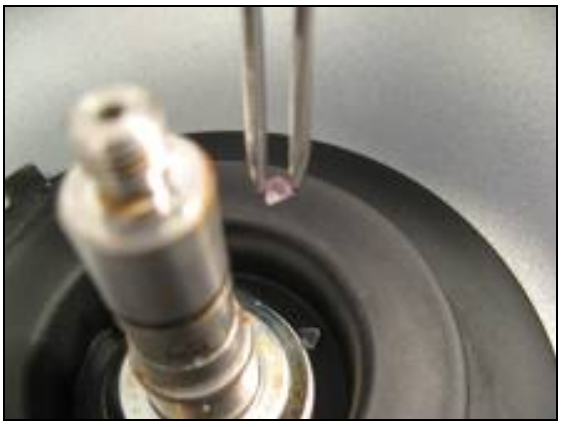
7. Rinse thoroughly with distilled water. Use a brush (i.e., a toothbrush or tube brush) to clean any parts that are difficult to access, such as the bucket mount and the rotor head (see figures in Section 6.4.1). Wipe surfaces dry with a soft lint-free cloth. If available, dry the buckets and rotor with pressurized air.
   We recommend drying using pressurized air to remove any small plastic particles adhering to the rotor or the buckets. When handling the bucket, pay particular attention that the bucket mount is not damaged.
   Important: Be sure to only use lint-free paper towels and brushes.
   Important: Make sure all residual plastic and salt are removed.
   Important: Make sure all traces of cleaning agent are removed from the centrifuge buckets. Residual disinfectant can cause the buckets to jam.
8. Apply a few drops of mineral oil (Anti-Corrosion Oil (rotor), cat. no. 9018543) on a soft, lint-free cloth, and wipe the bucket mount and rotor claw. A thin, invisible oil film should cover the bucket mount and rotor claw, but no droplets or smear should be apparent.
   Important: Before applying oil to the rotor buckets on the rotor, make sure that the rotor and all buckets are completely dry.

6.6.3 Cleaning the centrifuge

1. Moisten a soft lint-free cloth with cleaning agent, and clean the inside of the centrifuge and the centrifuge gasket. Incubate as appropriate.
   Note: Do not spray disinfectant into the centrifuge.
2. Clean with water, and wipe dry with lint-free paper towels. If available, use a vacuum cleaner to remove any small plastic particles from the inside of the centrifuge.
   Tweezers or tape can be used to remove plastic particles from any difficult to access parts. Special care must be taken to remove any plastic particles from the rotor pegs, floor and back of the centrifuge compartment, and the rotor shaft guide.



Removing plastic debris with tape.



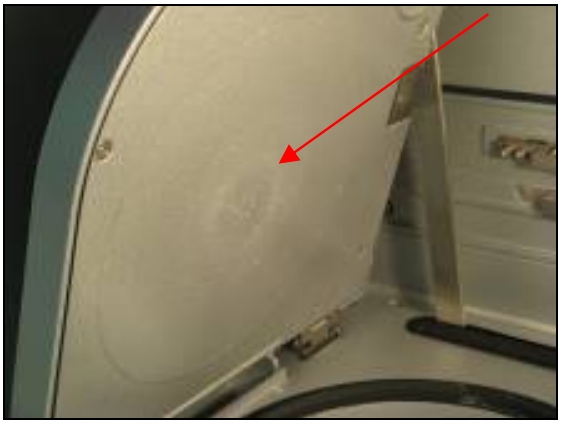
Removing plastic debris with tweezers.

Important: Make sure to use lint-free paper towels.

Important: Make sure that all plastic particles are removed.

Important: Make sure the gaskets remain in the proper positions.

3. Clean the centrifuge lid with a soft lint-free cloth moistened with a cleaning agent. Incubate as appropriate, and wipe dry with paper towels.



Centrifuge lid with plastic dust.

4. Check if plastic particles are below the gasket.

5. Check the centrifuge gasket for damage. If the gasket is damaged or shows signs of wear, contact QIAGEN Technical Services.

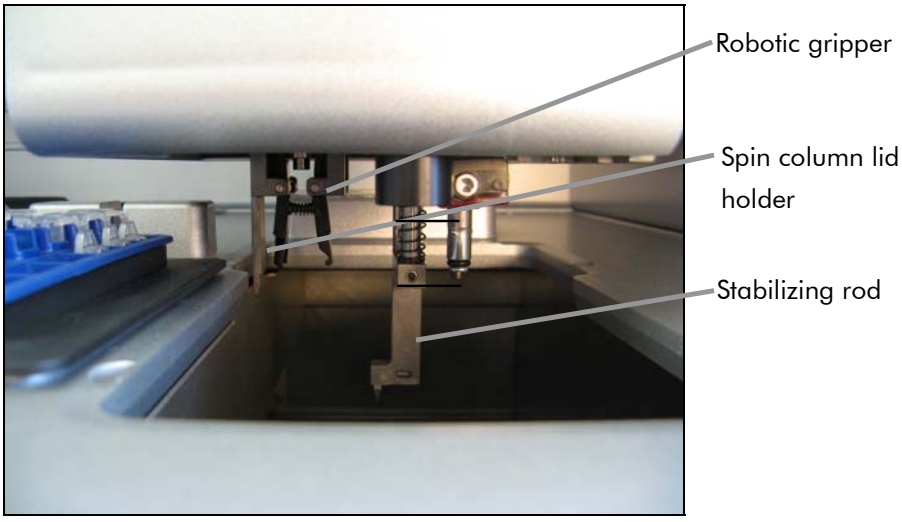
6.6.4 Cleaning the worktable

1. Empty the waste drawer and check that the liner is clean. If necessary, clean with cleaning agent, and rinse with distilled water.
2. Clean the shaker rack, labware tray, heating adapter, and reagent bottle rack with cleaning agent. Rinse thoroughly with distilled water, and wipe dry with paper towels.
3. Clean the surface of the worktable using a soft lint-free cloth moistened with cleaning agent. Incubate as appropriate, clean with water and wipe dry with lint-free paper towels.
   Do not spray liquid onto the worktable. Take particular care not to spray liquid onto the display.
   Important: Make sure to use lint-free paper towels.
   Important: Make sure that every plastic item is wiped off.

Centrifuge and worktable after cleaning.

6.6.5 Cleaning the gripper unit

1. Switch on the QIAcube on the power switch
2. Moisten a soft lint-free cloth with 70% ethanol.
3. Press "Tools" in the main menu.
4. Highlight "Maintenance" (scroll through the list by pressing "▲" or "▼"), and press "Select".
5. Highlight "Cleaning position" (scroll through the list by pressing "▲" or "▼"), and press "Start".
6. Follow the instructions displayed in the touchscreen.
   You will be asked to remove the waste drawer and the labware tray.
   The robotic arm will move forward and down, enabling the gripper unit to be accessed for cleaning through the opening for the waste drawer.
7. Carefully wipe the gripper unit, including the gripper, the stabilizing rod, and the spin column lid holder.
   Important: Make sure to use lint-free paper towels. Ensure that any residual salt is removed.



Cleaning the gripper unit.

6.6.6 Installing the centrifuge rotor and buckets

1. Mount the rotor.
   The rotor can be mounted in only one orientation. The pin on the rotor shaft fits into a notch on the underside of the rotor directly underneath rotor position 1. Line up position 1 of the rotor with the pin on the rotor shaft and carefully lower the rotor onto the shaft. Install the rotor nut on top of the rotor and tighten using the rotor key supplied with the QIAcube. Make sure that the rotor is securely seated.

WARNING	**Risk of personal injury and material damage** [W17] The rotor nut must be securely tightened using the rotor key supplied with QIAcube. If the rotor nut is not tightened properly, it can become loose during operation of the centrifuge.

2. Replace the rotor buckets.
   When replacing the rotor buckets, the side of the rotor bucket that must face toward the rotor shaft is marked with a gray line. Hold the bucket at an angle with the gray line facing the center of the rotor and hang the bucket on the rotor. Check that all buckets are properly suspended and can swing freely.

Note: The side of the rotor bucket that must face towards the rotor shaft is marked with a gray line to help prevent buckets from being loaded incorrectly.
Important: All centrifuge buckets must be mounted before starting the test run.

6.6.7 Operating the centrifuge after cleaning

The centrifuge must be operated independently before starting further protocol runs to test if residual plastic parts are still in the centrifuge.

For detailed information about operating the centrifuge, see Section 5.8.

1. Switch on the QIAcube at the power switch.
2. Set centrifugation parameters for a centrifuge test protocol.
   Press “Tools” in the main menu.
   Highlight “Centrifuge” (scroll through the list by pressing “▲” or “▼”, and press “Select”.
   To select the speed, time, and acceleration, press “Edit” and set the following parameters.
   - “Time 1”: 60 sec
   - “Speed 1”: 12,000 g
   - “Acceleration”: 9
   - “Time 2”: 0 sec
   - “Speed 2”: default

   Press “Back” to exit edit mode.
   Press “Start” to start the centrifuge.
   Note: Rotor adapters and other consumables are not required.
3. Carefully listen to the sound during centrifugation.
   Unusual sound during centrifugation:
   If any grinding, rattling, or crunching sounds are heard during the centrifugation, there are still loose plastic particles inside the centrifuge. Repeat the cleaning procedure described in Section 6.6.
   Note: it may be necessary to repeat the procedure several times to remove all plastic particles.

No unusual sound during centrifugation:
If no unusual sound from loose plastic particles can be heard during centrifugation, the next sample run can be started.

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7 Troubleshooting

7.1 General information

Whenever encountering a QIAcube error, be sure to have the following information at hand:

- Protocol name and version (found in the report file)
- Software version (see Section 5.5)
- Sample input material
- Detailed description of the error situation

This information will help you and your QIAGEN Technical Service Specialist to deal most efficiently with your problem.

Note: Information about the latest software and protocol versions can be found at www.qiagen.com/QIAcube/Resources . In some cases, updates may be available for addressing specific problems.

7.2 Resolving error messages and warnings

Error messages or warnings are displayed in the touchscreen if a problem occurs during operation. Refer to the error codes listed in this section if an error message or warning appears. If error messages or warnings appear that are not listed here or if the error cannot be resolved, note down the error code and description and the steps leading to the error, and contact QIAGEN Technical Services.

Note: It is only possible to continue a protocol run that has been interrupted due to an error if the error occurs before the protocol has started (e.g., during the load check). If an error occurs during sample processing, the samples must be processed manually (see Section 7.2.6).

If an error occurs during the load check, the protocol run can be continued as soon as the error has been resolved.

Note: When resolving a load check error, only move or change the affected samples or consumables.

7.2.1 Load check errors

Error code	Description	Comments and suggestions
301	Optical sensor error: invalid teaching	Check worktable for loose plasticware. Clean the optical sensor.
302	Optical sensor error: invalid measurement	Clean the optical sensor.
317, 320	Ultrasonic sensor error	Make sure that there is no foam in the reagent bottles. Check that the bottles contain sufficient reagent and are in the correct positions in the reagent bottle rack. Make sure that the labeling strips are attached correctly (Section 5.3.1).
3200	Load check error: invalid rotor loading	Check that the rotor is symmetrically loaded. Clean the optical sensor.
3201	Load check error: not enough buffer	Check the volume of reagent in the reagent bottles. Make sure that the bottles are in the correct positions in the reagent bottle rack.
3202	Load check error: buffer empty, too much buffer, or capped buffer bottle	Check the volume of reagent in the reagent bottles. The maximum volume is 30 ml and is indicated by a calibration mark. Make sure that the caps have been removed from the reagent bottles.
3203	Load check error: too few wide-bore 1000 µl tips	Make sure to load sufficient 1000 µl wide-bore filter-tips for the protocol run.
3204	Load check error: too few 1000 µl tips	Make sure to load sufficient 1000 µl filter-tips for the protocol run.

Error code	Description	Comments and suggestions
3205	Load check error: too few 200 µl tips	Make sure to load sufficient 200 µl filter-tips for the protocol run.
3206	Load check error: invalid shaker loading	Check that the shaker is correctly loaded (see Section 5.3.4) and the sample tubes are in the correct position (see Appendix B). In particular, make sure that the latest version of the shaker rack plug is being used and that only loaded positions are marked. Clean the optical sensor.
3207	Load check error: too much buffer in bottle	Check that the reagent bottle is not overfilled. The maximum volume is 30 ml and is indicated by a calibration mark.
3208	Load check error: no sample tubes or invalid sample tubes detected	Check that samples have been loaded onto the shaker. Clean the optical sensor. Check the worktable for obstructions that might prevent movement of the shaker. Make sure that the correct shaker adapter is installed.
3212	Load check error: remove labware tray	Remove the labware tray and start the "Cleaning position" protocol again.
3302	Error: instrument door is open	Make sure that the QIAcube door is properly closed. Switch off the QIAcube, wait for a few minutes, and switch it back on again. If the error persists, contact QIAGEN Technical Services.
3303	Error: picked up wrong tip	Check that tip racks are correctly loaded (see Section 5.3.2).

Error code	Description	Comments and suggestions
3304	Error: picked up no tip	Clean the tip sensor. When using a plain white 200 µl tip rack, always fill the tip rack with 200 µl tips. Alternatively, replace the white rack with the optimized blue rack for 200 µl tips.

7.2.2 Protocol errors

Error code	Description	Comments and suggestions
403	Protocol error: protocol not found	Reload the protocol from the USB stick (see Section 5.4). Switch off the QIAcube, wait for a few minutes, and switch it back on again. If the error persists, contact QIAGEN Technical Services.
404	Protocol error: invalid protocol data format (checksum error)	Delete the protocol from the QIAcube. Download the protocol from the QIAGEN website (www.qiagen.com/QIAcube/Resources) to the USB stick. Reload the protocol to the QIAcube (see Section 5.4). Switch off the QIAcube, wait for a few minutes, and switch it back on again. If the error persists, contact QIAGEN Technical Services.

Error code	Description	Comments and suggestions
405	Protocol error: unable to save protocol	Delete protocols from the QIAcube that are no longer required and reload the protocols from the USB stick (see Section 5.4). Switch off the QIAcube, wait for a few minutes, and switch it back on again. If the error persists, contact QIAGEN Technical Services.
406	Protocol error: maximum number of protocols	Delete protocols from the QIAcube that are no longer required (see Section 5.4). Switch off the QIAcube, wait for a few minutes, and switch it back on again. If the error persists, contact QIAGEN Technical Services.
407	Protocol error: unable to save protocol list	Delete protocols from the QIAcube that are no longer required (see Section 5.4). Switch off the QIAcube, wait for a few minutes, and switch it back on again. If the error persists, contact QIAGEN Technical Services.
408	Protocol error: max. protocol steps exceeded	Contact QIAGEN Technical Services for a new protocol.
409	Protocol error: missing liquid definition	Contact QIAGEN Technical Services for a new protocol.
410	Protocol error: missing vessel definition	Contact QIAGEN Technical Services for a new protocol.
412	Protocol error: missing working space definition	Contact QIAGEN Technical Services for a new protocol.

Error code	Description	Comments and suggestions
414	Protocol error: missing liquid class definition	Contact QIAGEN Technical Services for a new protocol.
415	Protocol error: missing liquid definition	Contact QIAGEN Technical Services for a new protocol.
416	Protocol error: invalid protocol parameter	Contact QIAGEN Technical Services for a new protocol.
417	Protocol error: parameter type mismatch	Contact QIAGEN Technical Services for a new protocol.
418	Protocol error: invalid protocol version	Load the protocol again. If the error persists, contact QIAGEN Technical Services.
419	Protocol error: invalid protocol version	Protocol required new QIAcube firmware. Delete all protocols before updating. Load the protocol again. If the error persists, contact QIAGEN Technical Services. The most recent software versions can be downloaded from www.qiagen.com/QIAcube/Resources .
1000–1022	Protocol error	Contact QIAGEN Technical Services for new protocols.

7.2.3 File system errors

Error code	Description	Comments and suggestions
700	File system error: unable to delete data	Switch off the QIAcube, wait for a few minutes, and switch it back on again. If the error persists, contact QIAGEN Technical Services.
701	File system error: copy error to USB	Switch off the QIAcube, wait for a few minutes, and switch it on again. Save the file(s) to the USB stick again. If the error persists, contact QIAGEN Technical Services.
702	File system error: missing USB device	Switch off the QIAcube, wait for a few minutes, and switch it on again. Insert the USB stick into the USB port. If the error persists, contact QIAGEN Technical Services.
703	File system error: unable to read data	Switch off the QIAcube, wait for a few minutes, and switch it on again. Save the file(s) to the USB stick again. If the error persists, contact QIAGEN Technical Services.
704	File system error: flashdisk is full	Delete protocols from the QIAcube that are no longer required. If the error persists, contact QIAGEN Technical Services.
705	File system error: checkdisk error	Memory error or memory defective indicating that the USB stick may be partially or entirely corrupted. Format the USB stick according to instructions at www.qiagen.com/QIAcube/Resources .

7.2.4 General instrument errors

Error code	Description	Comments and suggestions
1–33	Internal motion error	Identify and make a note of the axis in error (as listed in the error message). Switch off the QIAcube, wait for a few minutes, and switch it back on again. If the error persists, contact QIAGEN Technical Services.
50-52	Motor driver error: overload/no motor detected/power surge	Identify and make a note of the axis in error (as listed in the error message). Switch off the QIAcube and check the worktable for damage or evidence of a collision. If the error persists, contact QIAGEN Technical Services.
53	Motor driver error: overheat prewarning	Make sure that the QIAcube is operating under the correct conditions (see page 1-3 and Appendix A).
54	Motor driver error: overheat	Make sure that the QIAcube is operating under the correct conditions (see Section 4.1 and Appendix A).
70	Motion error: stopped in limit switch	Identify and make a note of the axis in error (as listed in the error message). Switch off the QIAcube and check the worktable for loose plasticware.
80	Homing error: reference switch failure on <> axis	Identify and make a note of the axis in error (as listed in the error message). Switch off the QIAcube and check the worktable for loose plasticware. If the error persists, contact QIAGEN Technical Services.

Error code	Description	Comments and suggestions
303	Memory module: RAM test failure	Switch off the QIAcube, wait for a few minutes, and switch it back on again. If the error persists, contact QIAGEN Technical Services.
330–331	Internal shaker/heater error	Switch off the QIAcube, wait for a few minutes, and switch it back on again. If the error persists, contact QIAGEN Technical Services.
340–359	Internal centrifuge error	Contact QIAGEN Technical Services.
500-502	Program not ready or in error state	A protocol cannot be started if the previous instruction is not completed and the instrument is busy. Switch off the QIAcube, wait for a few minutes, and switch it back on again. If the error persists, contact QIAGEN Technical Services.
600	Logging error: buffer overflow	Although this code is presented as an error, it is a warning and can be ignored. It will not result in protocol interruption.
900-999	Firmware update error	Please contact QIAGEN Technical Services.
2000	General error: PLC programming error	Switch off the QIAcube, wait for a few minutes, and switch it back on again. If the error persists, contact QIAGEN Technical Services.

Error code	Description	Comments and suggestions
3000	Centrifuge error: failed positioning	Make sure that the rotor is installed. Check that the rotor is correctly positioned on the rotor shaft. Switch off the QIAcube, wait for a few minutes, and switch it back on again. If the error persists, contact QIAGEN Technical Services.
3001	Centrifuge error: invalid *g* range	Contact QIAGEN Technical Services for a new protocol.
3101	Motion error: invalid rotation axis move	Switch off the QIAcube, wait for a few minutes, and switch it back on again. If the error persists, contact QIAGEN Technical Services.
3102	Motion error: invalid disposal position	Switch off the QIAcube, wait for a few minutes, and switch it back on again. If the error persists, contact QIAGEN Technical Services.
3103	Motion error: invalid Z axis move	Check the worktable for obstructions. Switch off the QIAcube, wait for a few minutes, and switch it back on again. If the error persists, contact QIAGEN Technical Services.
3104	Motion error: invalid tip rack	Make sure that the tip rack is not damaged and is correctly positioned on the worktable. Switch off the QIAcube, wait for a few minutes, and switch it back on again. If the error persists, contact QIAGEN Technical Services.

Error code	Description	Comments and suggestions
3106	Motion error: tip detection failed	Check to see if there are loose tips on the worktable or if the rack still contains tips that should have been picked up. Switch off the QIAcube, wait for a few minutes, and switch it back on again. If the error persists, contact QIAGEN Technical Services.
3108	Motion error: invalid gripper position	Switch off the QIAcube, wait for a few minutes, and switch it back on again. If the error persists, contact QIAGEN Technical Services.
3109	Motion error: homing limit reached, no light barrier found	Identify and make a note of the axis in error (as listed in the error message). Check the worktable for obstructions. Switch off the QIAcube, wait for a few minutes, and switch it back on again. If the error persists, contact QIAGEN Technical Services.
3110	Motion error: no motion profile found for XY move	Switch off the QIAcube, wait for a few minutes, and switch it back on again. If the error persists, contact QIAGEN Technical Services.

Error code	Description	Comments and suggestions
4000	Motion error: step loss on one axis	Identify and make a note of the axis in error (as listed in the error message). Check the worktable and the centrifuge for obstructions. Make sure that the correct plasticware was used. Check that all plasticware is loaded in the correct positions and is seated firmly. Switch off the QIAcube and carefully pull the robotic arm forward. Check that the tip disposal slot is not blocked. Make sure that a disposable tip is not stuck to the tip adapter or that a spin-column or microcentrifuge tube is not stuck to the robotic gripper. . If an item is stuck, reinitialize the QIAcube or contact QIAGEN Technical Services. If the problem persists, contact QIAGEN Technical Services.
5024–5027	Centrifuge error: lid drive error	Make sure that nothing is obstructing the centrifuge lid. Switch off the QIAcube, wait for a few minutes, and switch it back on again. If the error persists, contact QIAGEN Technical Services.
5031	Centrifuge error: motor overheat	Make sure that the QIAcube is operating under the correct conditions (see Section 4.1 and Appendix A). Switch off the QIAcube, and wait 10 min before switching it back on. If the problem persists, contact QIAGEN Technical Services.

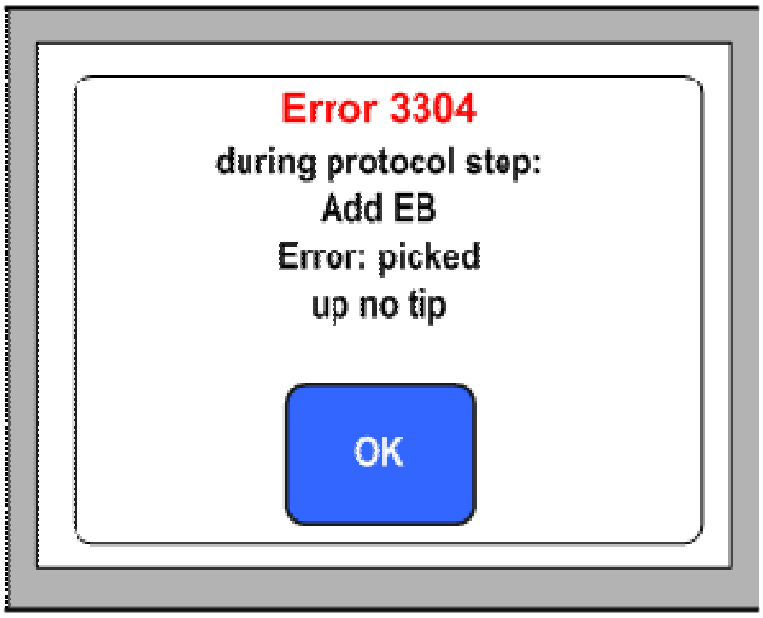
Error code	Description	Comments and suggestions
5032	Centrifuge error: electronics overheat	Make sure that the QIAcube is operating under the correct conditions (see Section 4.1 and Appendix A). Switch off the QIAcube, and wait 10 min before switching it back on. If the problem persists, contact QIAGEN Technical Services.
5129	Centrifuge error: imbalance detected	Make sure that the rotor is symmetrically loaded. Remove the rotor and check the centrifuge chamber for loose plasticware. Switch off the QIAcube, wait for a few minutes, and switch it back on again. If the error persists, contact QIAGEN Technical Services.

7.2.5 General troubleshooting

	Comments and suggestions
Rotor adapter deformed or lid of spin-column broken off	
Disposable rotor adapter not properly loaded	Remove the rotor and buckets from the centrifuge. Remove plastic shards from the centrifuge. Clean the rotor and buckets and replace in the centrifuge as described in Section 6.6.
Errors in pipetting or drops of buffer on the worktable	
Worktable loaded incorrectly	Check that the reagent bottles contain the correct buffers and are correctly placed in the reagent bottle rack. Be sure to use the right plasticware. Check the volumes in the sample tubes and tubes of accessory buffer(s), if applicable. Do not exceed the recommended amount of starting material to avoid blocking disposable filter-tips. If tip racks have been refilled, make sure that the correct tips were used.
System tightness issue	Perform system tightness test (see Section 6.4.3).

7.2.6 Protocol interruption

If an error occurs during a protocol run, it is possible to continue sample preparation manually. The error code, the description, and the step at which the protocol stopped are displayed in the touchscreen. In the example below, the protocol stopped during addition of Buffer EB to the samples.



To continue sample processing:

1. Note the step at which the protocol stopped. This is displayed in the touchscreen.
2. Remove the samples and reagents from the QIAcube.
3. Refer to the appropriate protocol in the relevant kit handbook and continue sample processing manually.

7.2.7 Centrifuge

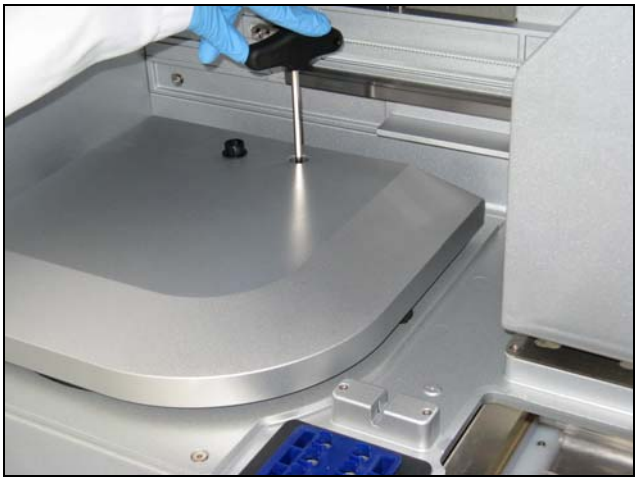
Opening the centrifuge lid in the event of a breakdown

In case of power failure, the centrifuge lid can be manually opened so that the samples can be removed. To open the centrifuge lid, follow the instructions below.

WARNING	**Moving parts** [W12] In case of breakdown caused by power failure, remove the power cord and wait 10 minutes before attempting to manually open the centrifuge lid.

WARNING	**Risk of personal injury and material damage** [W13] Raise the centrifuge lid carefully. The lid is heavy and may cause injury if it falls down.

1. Switch off the QIAcube.
2. Unplug the power cord from the power outlet. Wait 10 min for the rotor to stop.
3. Open the instrument door.
4. Carefully move the robotic arm to the right side of the worktable, furthest away from the centrifuge lid.
5. Remove the screw protection on top of the centrifuge lid.
6. Using the rotor wrench, turn the screw counter clockwise.



Turning the screw in the centrifuge lid.

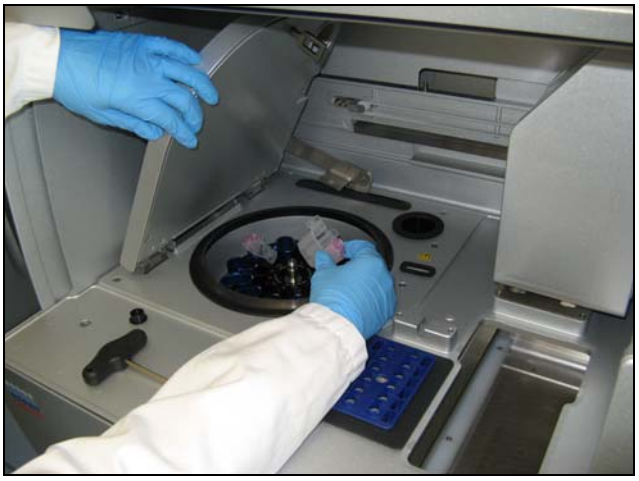
7. Remove the waste drawer.
   A white disk that is attached to the end of the centrifuge-lid release cord will be visible through the waste drawer compartment. The disk can be accessed by reaching through the opening for the waste drawer.

Accessing the centrifuge-lid release cord.

8. Grasp the disk and pull to access to the cord. Pull the cord firmly to release the lid from the lock.

Pulling the centrifuge-lid release cord.

9. Manually raise the centrifuge lid.
10. Hold the raised lid and remove the samples from the rotor.



Removing samples.

11. Contact QIAGEN Technical Services for instructions on how to reset the lid.

Increased sample temperature

Check the slits and openings at the bottom and the rear of the instrument.

WARNING	**Risk of overheating** [W14] To ensure proper ventilation, maintain a minimum clearance of 10 cm at the sides and rear of the QIAcube. Slits and openings that ensure the ventilation of the QIAcube must not be covered.

- Slits and openings for ventilation must not be covered.
- You should be able to detect an air-flow at the openings. If an air-flow cannot be detected, contact QIAGEN Technical Services.

Excessive noise

Excessive noise during centrifugation may indicate that there are loose parts inside the centrifuge or that the rotor is not balanced.

1. Press “Cancel” to stop the protocol run.
2. When the centrifuge has come to a complete stop, the lid should open. If the lid does not open:

- Press “Tools” in the main menu.
- Select “Maintenance” by pressing “▲” or “▼” to scroll through the list until it is highlighted, and then press “Select”.
- Select “Open lid” by pressing “▲” or “▼” to scroll through the list until it is highlighted, and then press “Select”.

3. Remove the buckets from the rotor. Undo the rotor nut on top of the rotor using the rotor key and carefully lift the rotor off the rotor shaft.
4. Check that there are no loose parts inside the centrifuge or on the rotor. Check that the rotor is loaded symmetrically. Check that the rotor, buckets, and gasket are not damaged.
5. If there are loose parts inside the centrifuge or on the rotor, clean according to Section 6.6.

Liquid spills in the centrifuge

The rotor adapter is designed for use with QIAGEN automated protocols. Do not fill the rotor adapters with liquid.

Liquid spills may occur if QIAGEN spin columns become blocked due to sample overloading. Do not exceed the maximum amount of starting material.

Incorrect installation of the centrifuge buckets may also cause rotor adapters to leak. Check that the buckets are installed properly and can swing freely (see page 4-6).

If there is a liquid spill in the centrifuge, clean according to the instructions in Section 6.4.1.

7.2.8 Shaker

Sample temperature too low

To ensure efficient heat transfer, make sure to use the correct shaker adapter. Choose the appropriate shaker adapter for the sample tubes:

- Adapter for 2 ml microcentrifuge tubes (2)
- Adapter for 2 ml screw-cap tubes (S2)

7.2.9 Touchscreen

Display

The QIAcube beeper should sound and the startup screen should be displayed when the QIAcube is switched on. If this does not happen, check that the power cord is properly connected.

If the QIAcube beeper sounds when the QIAcube is switched on but the startup screen is not displayed, contact QIAGEN Technical Services.

If the display does not react when pressed, improper cleaning procedures might have caused liquid to enter the space between the display sheets and liquid might be visible in sections of the touchscreen. Contact QIAGEN Technical Services.

7.2.10 USB stick

Only use USB sticks supplied by QIAGEN. Other USB sticks may not work with the QIAcube.

7.2.11 Reagent volume detection

To help prevent errors during detection of reagent volumes, make sure that both rack labeling strips are attached to the reagent bottle rack. These strips ensure that the reagent bottle rack is positioned correctly on the worktable for liquid detection during the load check.

Also make sure that the bottle rack is sitting correctly in the labware tray (see Section 5.3.1).

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8 Glossary

Term	Description
Centrifuge	A component of the QIAcube that accommodates a rotor with 12 swing-out buckets. Each bucket holds a disposable rotor adapter.
Column disposal slot	A slot in the QIAcube worktable through which used columns (e.g., QIAshredder columns) are discarded into the waste drawer.
Dilutor unit	A module consisting of a syringe pump (syringe, dilutor valve, motor) and a tip adapter. The dilutor unit is for high-precision aspiration and dispensing of liquid.
Disposal slots	Slots in the QIAcube worktable through which used tips and columns (e.g., QIAshredder columns) are discarded into the waste drawer.
Door	The main door at the front of the QIAcube. When open, it provides complete access to the worktable.
Error code	A 3 or 4 digit number that indicates a particular error of the QIAcube.
Filter-tip	An item of labware that is picked up by the tip adapter during operation of the QIAcube. Liquid is aspirated into and dispensed from a filter-tip.
Initialization	An operation performed automatically when the QIAcube is switched on and before each protocol run to check the operation of the QIAcube.
Labware tray	An item that accommodates the reagent bottle rack, the tip racks, and has 3 slots for accessory buffers in 1.5 ml or 2 ml microcentrifuge tubes.
Microcentrifuge tube slots	Three slots located in the labware tray that accommodate accessory buffers, in 1.5 ml or 2 ml microcentrifuge tubes.

Term	Description
Pipetting system	The component of the QIAcube that aspirates and dispenses liquid. The pipetting system moves up and down above the worktable and contains a syringe pump that is connected to a tip adapter.
Power switch	A button located at the front of the QIAcube in the bottom-right corner. It allows the user to switch the QIAcube on and off.
Protocol	A set of instructions for the QIAcube that allows the instrument to automate a nucleic acid or protein purification procedure. Protocols are run using the touchscreen.
Reagent bottle rack	A rack that can accommodate six 30 ml bottles on the QIAcube worktable.
Robotic gripper	A component of the QIAcube robotic arm that moves spin columns during sample processing.
Rotor adapter	A disposable plastic adapter that fits into a centrifuge bucket and holds a QIAGEN spin column and microcentrifuge tube during sample processing.
Tip adapter	A metal probe installed on the pipettor head. During operation of the QIAcube, the tip adapter picks up filter-tips from the worktable.
Tip disposal slots	Slots in the QIAcube worktable through which used filter-tips are discarded into the waste drawer.
Tip rack	A plastic rack that accommodates filter-tips on the worktable.
Touchscreen	The user interface that allows the user to operate the QIAcube.
Waste drawer	A drawer that collects used filter-tips and disposable columns.
Worktable	The surface of the QIAcube where samples, reagents, and filter-tips are loaded.

Appendix A

Technical data

QIAGEN reserves the right to change specifications at any time.

Environmental conditions

Operating conditions

Power	100–120 V AC, 50/60 Hz, 650 VA (North America and Japan) 220–240 V AC, 50/60 Hz, 650 VA (Europe) Mains supply voltage fluctuations are not to exceed 10% of nominal supply voltages.
Overvoltage category	II
Air temperature	18 to 28°C (64.4 to 82.4°F)
Relative humidity	15–75% (noncondensing)
Altitude	Up to 2000 m (6500 ft.)
Place of operation	For indoor use only
Pollution level	2
Environmental class	3K2 (IEC 60721-3-3)

Transportation conditions

Air temperature	–25°C to 60°C (–13°F to 140°F) in manufacturer's package

Relative humidity Max. 75% (noncondensing)

Environmental class 2K2 & 2M2 (IEC 60721-3-2)

Storage conditions

Air temperature 15°C to 30°C (59°F to 86°F) in manufacturer's package

Relative humidity Max. 75% (noncondensing)

Environmental class 1K2 (IEC 60721-3-1)

Mechanical data and hardware features

Dimensions (door closed)
Width: 65 cm (25.6 in.)
Height: 57 cm (22.4 in.)
Depth: 62 cm (24.4 in.)

Dimensions (door open)
Width: 65 cm (25.6 in.)
Height: 81 cm (32 in.)
Depth: 62 cm (24.4 in.)

Mass
QIAcube: 71.5 kg (157.6 lb.)

Accessories: 3 kg (6.6 lb.)

Centrifuge
- 12,000 x *g* maximum
- Swing-out rotor, maximum 45°
- 12 rotor positions

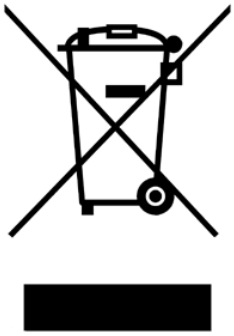
Shaker
- Speed 100–2000 rpm
- Amplitude 2 mm
- Heating range of ambient temperature to 70°C (158°F)
- Ramp-up time of <5 minutes from ambient temperature to 55°C (±3°C)
- Difference in the temperature detected by the internal sensor and the temperature of the sample liquid is approximately –2°C

Pipetting system	■ Syringe size 1 ml ■ Pipetting range 5–900 µl
Capacity	Up to 12 samples per run
Touchscreen	Transmissive TFT, 64 x 86 x 6.5 mm, white LED backlight, high brightness
Software	QIAGEN protocols are preinstalled on the QIAcube or can be downloaded at www.qiagen.com/MyQIAcube .

Waste Electrical and Electronic Equipment (WEEE)

This section provides information about disposal of waste electrical and electronic equipment by users in the European Union.

The European Directive 2002/96/EC on WEEE requires proper disposal of electrical and electronic equipment when it reaches its end of life. The crossed-out wheeled bin symbol (see below) indicates that this product must not be disposed of with other waste; it must be taken to an approved treatment facility or to a designated collection point for recycling, according to local legislation. The separate collection and recycling of waste electronic equipment at the time of disposal helps to conserve natural resources and ensures that the product is recycled in a manner that protects human health and the environment.



QIAGEN accepts its responsibility in accordance with the specific WEEE recycling requirements and, where a replacement product is being supplied by QIAGEN, provides free recycling of its WEEE-marked electronic equipment in Europe. If a replacement product is not being purchased from QIAGEN, recycling can be provided upon request at additional cost. To recycle electronic equipment, contact your local QIAGEN sales office for the required return form. Once the form is submitted, you will be contacted by QIAGEN either to request follow-up information for scheduling collection of the electronic waste or to provide you with an individual quote.

FCC declaration

The ''United States Federal Communications Commission'' (USFCC) (in 47 CRF 15. 105) declared that the users of this product must be informed of the following facts and circumstances.

''This device complies with part 15 of the FCC:

Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.''

"This Class B digital apparatus complies with Canadian ICES-0003.''

The following statement applies to the products covered in this manual, unless otherwise specified herein. The statement for other products will appear in the accompanying documentation.

***NOTE**: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules and meets all requirements of the Canadian Interference-Causing Equipment Standard ICES-003 for digital apparatus. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and*

used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that the interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

QIAGEN GmbH Germany is not responsible for any radio television interference caused by unauthorized modifications of this equipment or the substitution or attachment of connection cables and equipment other than those specified by QIAGEN GmbH, Germany. The correction of interference caused by such unauthorized modification, substitution or attachment will be the responsibility of the user.

EC declaration of conformity

Name and address of the company

QIAGEN GmbH
QIAGEN Strasse 1
40724 Hilden
Germany

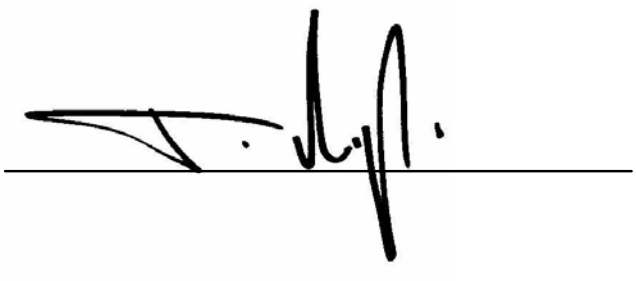
We herewith declare under our sole responsibility that the product

QIAcube, cat. nos. 9001292, -93, -94, -95

meets all applicable requirements of the following European Directives

Low Voltage Directive (LVD)	**2006/95/EC**
Electromagnetic Compatibility Directive (EMC)	**2004/108/EC**

Hombrechtikon, 7 May 2007



Pit Muggli

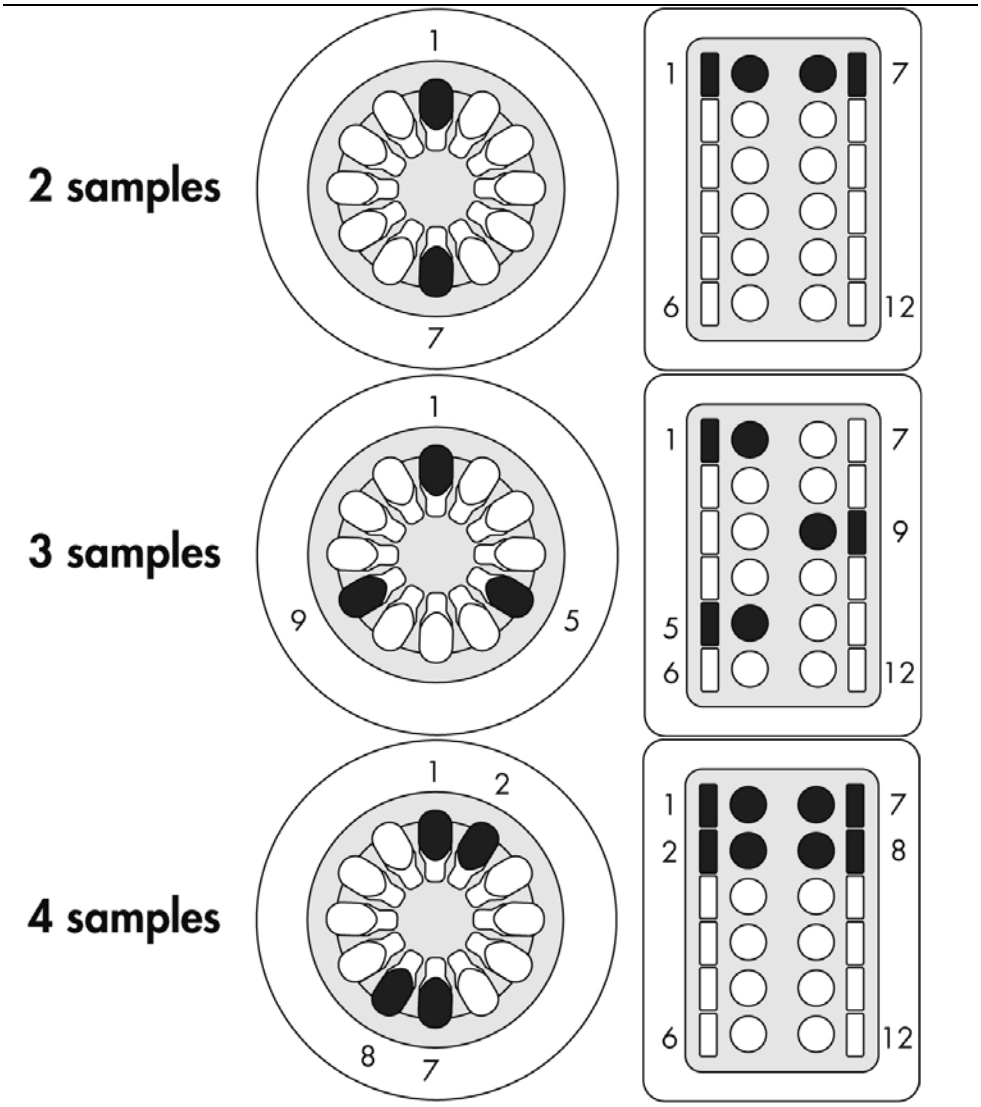
Director Business Excellence

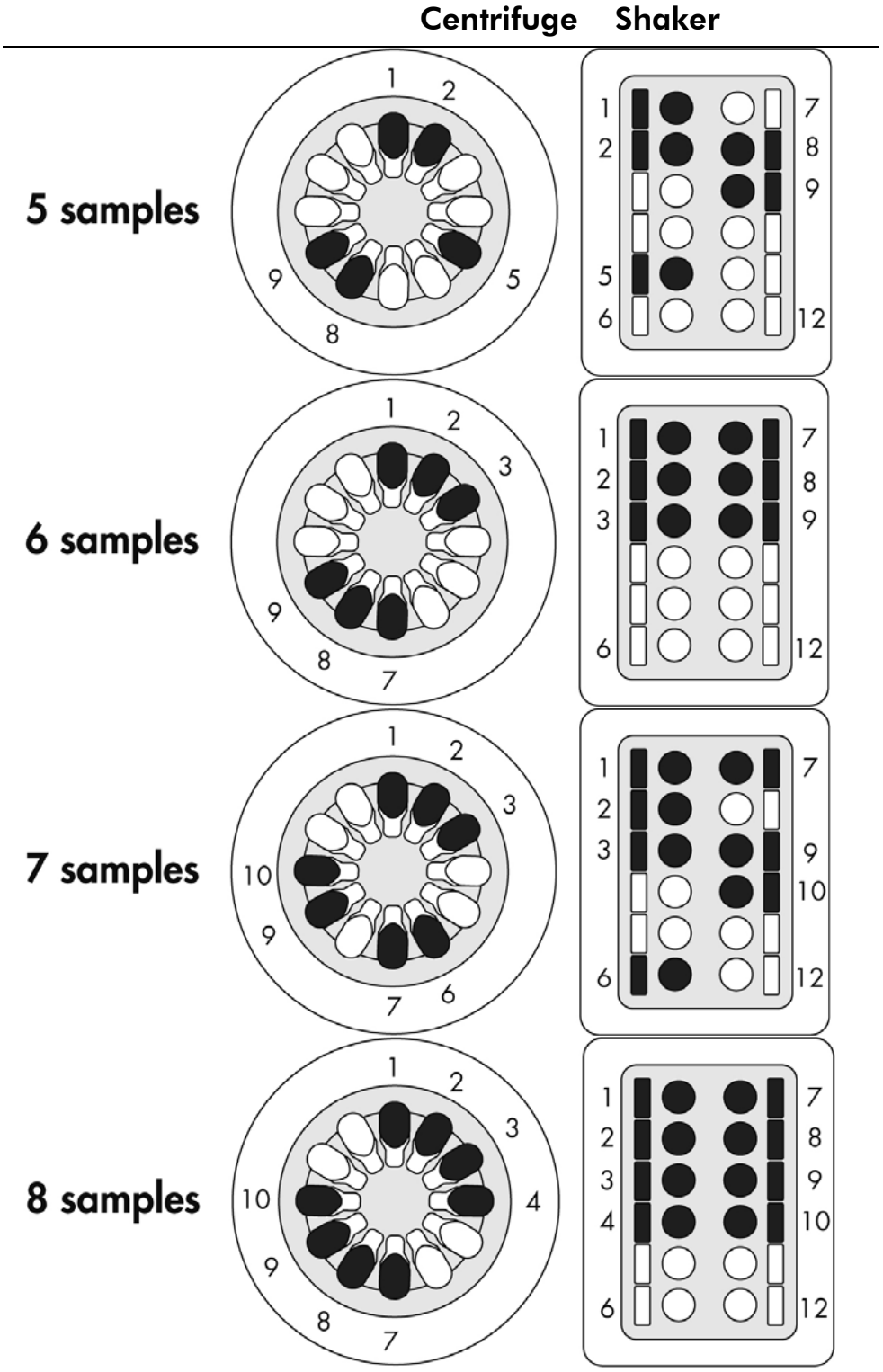
QIAGEN Instruments AG

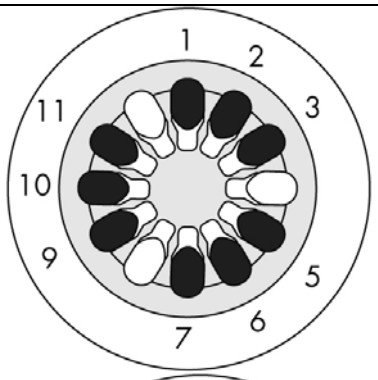
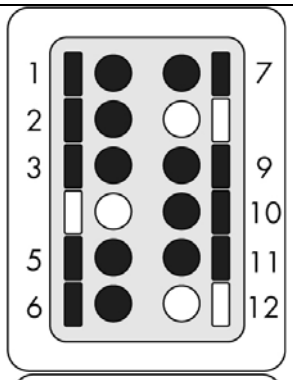
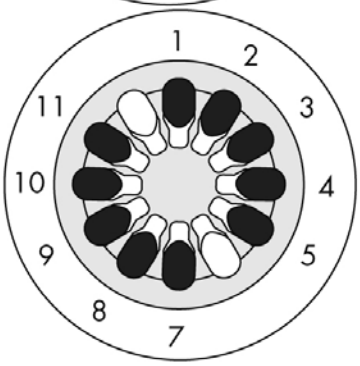
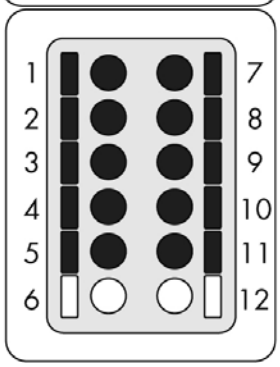
Appendix B

Loading the centrifuge and shaker

If fewer than 12 samples are to be processed, make sure to load the centrifuge and shaker correctly (see pictures below and following pages). One or 11 samples cannot be processed.




Centrifuge
Shaker
5 samples
1
2
5
8
9
1
2
5
6
7
8
9
12
6 samples
1
2
3
7
8
9
1
2
3
6
7
8
9
12
7 samples
1
2
3
6
7
9
10
1
2
3
6
7
9
10
12
8 samples
1
2
3
4
7
8
9
10
1
2
3
4
6
7
8
9
10
12

	Centrifuge	Shaker
9 samples		
10 samples		

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Appendix C

QIAcube accessories

For more information and an up-to-date list of available protocols, visit www.qiagen.com/MyQIAcube .

Product	Contents	Cat. no.
QIAcube (110 V)* QIAcube (230 V)†	Robotic workstation for automated purification of DNA, RNA, or proteins using QIAGEN spin-column kits, 1-year warranty on parts and labor‡	9001292* 9001293†
Accessories		
Starter Pack, QIAcube	Pack includes: reagent bottle racks (3); rack labeling strips (8); 200 µl filter-tips (1024); 1000 µl filter-tips (1024); 1000 µl filter-tips, wide-bore (1024); 30 ml reagent bottles (18); rotor adapters (240); rotor adapter holder; 1.5 ml microcentrifuge tubes (240)	990395
Filter-Tips, 1000 µl (1024)	Disposable Filter-Tips, racked; (8 x 128)	990352
Filter-Tips, 1000 µl, wide-bore (1024)	Disposable Filter-Tips, wide-bore, racked; (8 x 128); not required for all protocols.	990452
Filter-Tips, 200 µl (1024)	Disposable Filter-Tips, racked; (8 x 128)); not required for all protocols	990332

* US, Canada, and Japan. † Rest of world. ‡ Agreements for comprehensive service coverage are available; please inquire.

Product	Contents	Cat. no.
Spin Column Adapter Rings (25)	Spin column adapter rings for use with spin-columns that have screw-caps; not required for all protocols	990399
Rotor Adapters (10 x 24)	For 240 preps: 240 Disposable Rotor Adapters and 240 microcentrifuge tubes (1.5 ml); for use with the QIAcube	990394
Rotor Adapter Holder	Holder for 12 disposable rotor adapters; for use with the QIAcube	990392
Reagent Bottle Rack	Rack for accommodating 6 x 30 ml reagent bottles on the QIAcube worktable	990390
Rack Labeling Strips (8)	Identification strips for the QIAcube reagent bottle rack; for use with RNeasy® Mini Kits, QIAamp® DNA Mini Kits, QIAquick® Kits, QIAprep® Spin Miniprep Kit, QIAamp MinElute® Virus Spin Kit, and Ni-NTA Spin Kit	990391
Rack Labeling Strips, Accessory Set	Additional identification strips for the QIAcube reagent bottle rack; for use with the miRNeasy Mini Kit, DNeasy® Blood & Tissue Kit, MinElute Reaction Cleanup Kit, MinElute PCR Purification Kit, MinElute Gel Extraction Kit, EpiTect™ Bisulfite Kit, and QIAamp Viral RNA Mini Kit	990380
Reagent Bottles, 30 ml (6)	Reagent Bottles (30 ml) with lids; pack of 6; for use with the QIAcube reagent bottle rack	990393
Shaker Rack Plugs (12)	For use with 2.0 ml screw cap tubes	9017854
Sample Tubes RB (2 ml)	1000 safe-lock microcentrifuge tubes (2 ml) for use with the QIAcube	990381

Product	Contents	Cat. no.
Sample Tubes CB (2 ml)	1000 conical screw-cap tubes without skirted base (2 ml) for use with the QIAcube	990382
USB Stick	USB Stick; for use with the QIAcube	9017850

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Appendix D

Liability clause

QIAGEN shall be released from all obligations under its warranty in the event repairs or modifications are made by persons other than its own personnel, except in cases where the Company has given its written consent to perform such repairs or modifications.

All materials replaced under this warranty will be warranted only for the duration of the original warranty period, and in no case beyond the original expiration date of original warranty unless authorized in writing by an officer of the Company. Read-out devices, interfacing devices and associated software will be warranted only for the period offered by the original manufacturer of these products. Representations and warranties made by any person, including representatives of QIAGEN, which are inconsistent or in conflict with the conditions in this warranty shall not be binding upon the Company unless produced in writing and approved by an officer of QIAGEN.

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